MARINE REVIEW.

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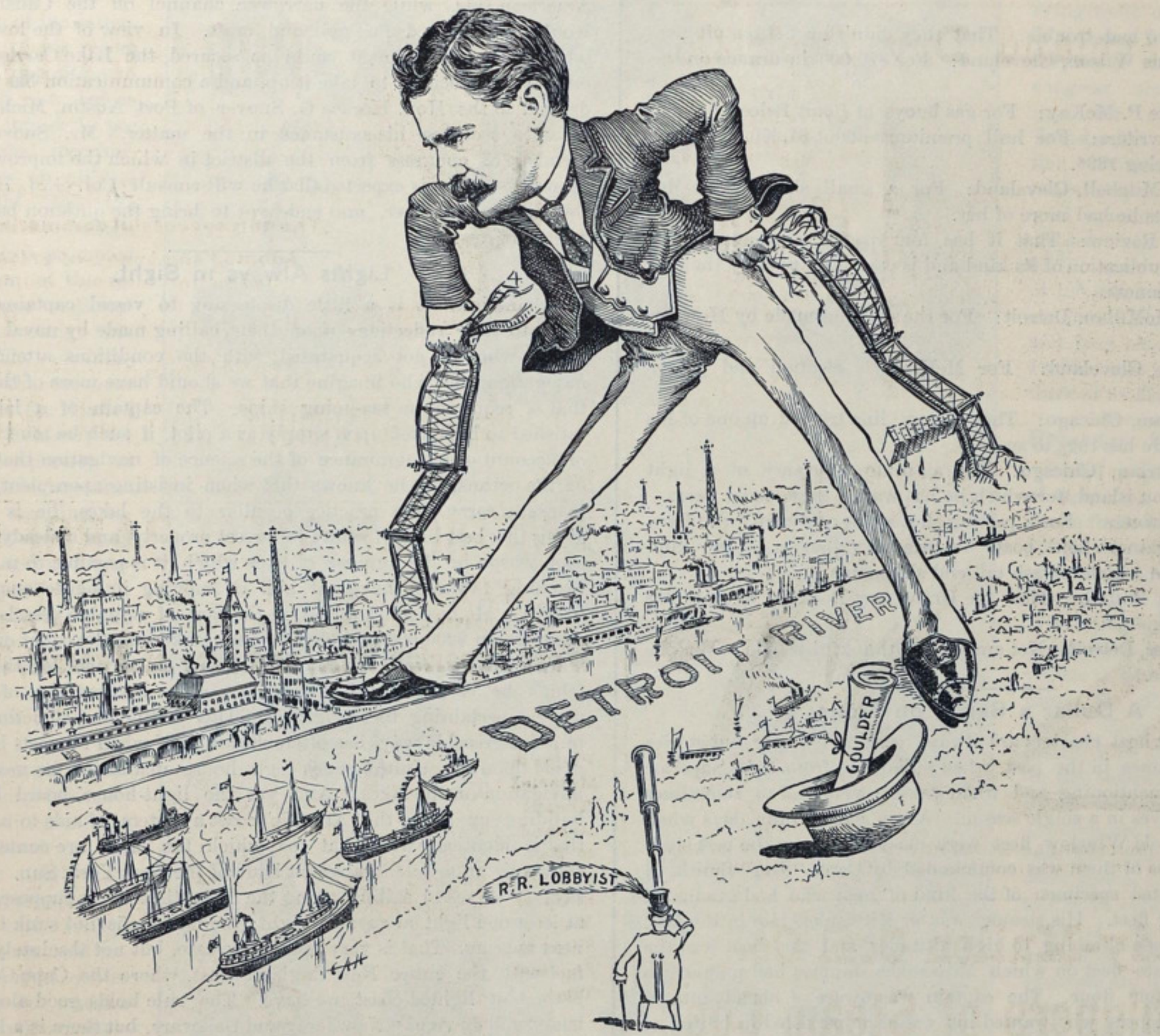
Another Bridge Fight.

It is now quite certain that another fight on the Detroit river bridge question will occur during the coming short session of congress. The bridge advocates, encouraged by their success with the senate committee on commerce at the last session, are to make a final effort in December, along the old lines of a bridge with piers in the river, on which the vessel interests will make no compromise. If they are defeated this time, it is not probable that the vessel interests will ever again be called upon to oppose a bridge bill, as the railway people will find it necessary to propose a tunnel or high bridge without piers of any kind in the river.



NO DETROIT RIVER BRIDGE WHILE HE LIVES.

More Contracts—Ship Yard Matters.

Orders to ship builders indicate that, although lake yards may not all be full this winter, the number of contracts will be much larger than was expeced. The Inter-Lake Transportation Co., which is the Cleveland corporation owning the steamers Kearsarge and Victory, has given an order to the American Steel Barge Co. for a tow barge that will be pracically a duplicate of the Rockefeller barge James Nasmyth—380 feet over all, 44 feet beam and 26 feet moulded depth. At the yard of the Globe Iron Works Co., Cleveland, two steel tow barges instead of one of the kind recently ordered by the Bessemer Steamship Co. will be put down. A purchaser will probably be found shortly for this second boat, but if not the Globe company's connection with the Mutual and Menominee transportation companies will insure operation of the vessel. The Chicago Ship Building Co. has another order for a tow barge and it will be the largest towing vessel ever built on the lakes. They will build for James Corrigan and others of Cleveland a steel schooner of 376 feet keel, 46 feet beam and 26 feet depth. The Cleveland Ship Building Co. also has another contract. They will build for A. B. Wolvin of Duluth a steamer that will be practically a duplicate of the Queen City but 6 feet longer. She will have Babcock & Wilcox water tube boilers, furnishing steam at 250 pounds pressure, and alike to the boat building in Chicago for Mr. Wolvin, will be fitted with quadruple expansion engines. Engine sizes have not as yet been definitely fixed.

Drake & Wallace of St. Joseph, Mich., will build an 80-foot river steamer. Machinery for the new boat will be taken from the old steamer Calumet, which was formerly in service on the Calumet river.

A. Abbey of Port Dalhousie, Ont., will build a wooden tug for Duncan Armstrong of Port Colborne, Ont.

A disptch from the Marquette Towing Co. announces that the tug Gillett of Marquette will not lay up until the close of navigation.

Thanksgiving Notes—Why Marine Men are Thankful.

A. B. Wolvin, Duluth: That there are a few more "City" names for boats he is thinking of building—Forest City, Windy City, Pork City, Beer City, City of the Straits, etc.

H. D. Goulder, Cleveland: That boats may pass up and down Detroit river without whistling for a drawbridge.

J. J. H. Brown, Buffalo: That the Lake Carriers' Association has prospered while he has been at the wheel.

A multitude of vessel owners not in the Lake Carriers' Association: That they get all the benefits of the organization without paying for them.

James Davidson, West Bay City: For $ $ $ $ $ $ $ $

W. I. Babcock, Chicago: For a ship yard full of work.

Owners of big vessels: For an 18-foot channel promised for next season.

Owners of little vessels: That the 18-foot channel isn't any deeper.

Alex. McDougall, West Superior: For big profits with the whalebacks on season ore contracts.

Captains who have had no trouble: That they managed to miss the shoal spots.

Captains who had trouble: That they didn't hit bottom oftener.

Capt. Thomas Wilson, Cleveland: For $70,000 insurance on the Wallula.

Capt. George P. McKay: For gas buoys at Point Pelee.

Lake underwriters: For hull premiums about $1,000,000 in excess of losses during 1896.

Capt. John Mitchell, Cleveland: For a small slice in the McWilliams; wishes he had more of her.

The Marine Review: That it has four pages more advertising than any other publication of its kind and is carefully read by the best people in the business.

Gilbert N. McMillan, Detroit: For the showing made by Howden hot draft.

Joe Doville, Cleveland: For McKinley's election and plenty of silver.

J. S. Dunham, Chicago: That a tow line tripped up one of his surplus tugs. He has tugs to spare.

Joseph Austrian, Chicago: For absolute assurance of a light on North Manitou island, for which he has waited these many years.

All vessel owners: For a parting shot at the coal men, who have discriminated against "hen" boats but are now glad to get any kind of an old hulk in which to rush tail-end shipments.

H. J. Mills, Buffalo: That the Union Dry Dock Co. is planning for another dock.

A. A. Parker, Detroit: Not among the thankful people. Wrecks have been scarce.

A Dollar a Barrel on Flour.

Four-cent wheat charters are always certain to bring out stories of prosperous times in the past, when dollar ore from Lake Superior was not worth mentioning and when vessels were said to sometimes pay for themselves in a single season. Away back in the days when vessels of the old Winslow fleet were classed asmong the best ships on the lakes, one of them was commanded by Capt. "Jim" Smith, a robust, big-hearted specimen of the kind of men who had graduated from the sailing fleet. His steamer was at Milwaukee late in the fall. Freights had been climbing to high altitudes, and this boat was the last of a Buffalo fleet on which Milwaukee shippers had planned to move considerable flour. The captain was aware of his advantage. To all of the shippers who wanted his vessel he persisted in telling of what a poor hand he was at figures, all the time refusing their offers of high freights on the flour. One of the shippers had a cargo which he was forced to move at almost any rate of freight. His last bid was well up towards a dollar a barrel, when the big captain, seeing his opportunity to gain the round figure for which he had been holding out, beckoned him aside with a confidential wink.

"You know," he said, "I'm not much of a scholar, but if you're detarmined on't, I'll take that flour, and every time a barrel goes aboard my mate puts down a mark. For every one of them marks I'm to get a dollar?"

The proposition was accepted, and the freight, $1 a barrel on flour from Milwaukee to Buffalo, was the biggest ever paid on the lakes.

Army and navy charts of the lakes are kept in stock by the Marine Review, Perry-Payne building.

An American Channel in the St. Clair River.

For a long time past the vessel interests have realized the necessity of securing a channel for deep-laden vessels on the American side of Stag island, St. Clair river. The channel on the American side of this island is much wider and deeper than the Canadian channel, but the latter is used entirely on account of a few shallow spots on the American side. These shallow places could be dredged at a very moderate cost. Anyone who will glance at the chart will find that the material is of a kind that can be readily removed, and that the expense of cutting off a few lumps in the channel would be a mere trifle as compared with other big works that have been undertaken within the past few years. But the big works were of immediate necessity, while the Canadian channel in the locality referred to has, up to this time, answered the requirements of commerce. Ships are getting larger and more numerous each year, however, and there would be a great advantage now in having two channels at this point in the St. Clair river. Vessels are at times actually crowded in the narrow Canadian channel. If there was free passage on both sides of the island, the deep-laden vessels bound down could pass to the American side, while the narrower channel on the Canadian side would be reserved for upbound craft. In view of the low cost at which this improvement could be secured, the Lake Carriers' Association has decided to take it up, and a communication has been addressed to the Hon. Horace G. Snover of Port Austin, Mich., with a view to securing his assistance in the matter. Mr. Snover is the member of congress from the district in which the improvement is proposed, and it is expected that he will consult Col. G. J. Lydecker, the district engineer, and endeavor to bring the question before the next congress.

Lights Always in Sight.

Sometimes it is a little displeasing to vessel captains on the lakes to hear reflections upon their calling made by naval men and others who are not acquainted with the conditions attending lake navigation, and who imagine that we should have more of the science that is required on sea-going ships. The captain of a lake ship is satisfied to be looked upon simply as a pilot, if such he must be called on account of his ignorance of the science of navigation that prevails on the oceans, but he knows that when insisting upon plenty of land marks to carry out a practice peculiar to the lakes, he is working along the best line of safety to vessel property and a steady increase each season in the number of trips which it is possible to make, thus reaching towards the great aim of moving immense quantities of freight. He has other duties in the care of valuable vessels, some of them worth $200,000 to $300,000, that make him the equal of the man whose ship is worth no more, but who, on account of the trade in which he is engaged, is bound to possess a knowledge of scientific matters pertaining to navigation. This distinction, sometimes made in a disagreeable way, has often shown itself when requests have been made upon the United States light-house institution for more aids to navigation on the lakes. And yet the light-house board has been building up along the Atlantic coast a system of aids to navigation that is identical with that for which the lakes are contending, as shown by an article in a recent issue of the New York Sun. The Sun says: "A vessel sailing along the Atlantic coast is supposed to have at least one light always in sight; the last one is not sunk before the next appears. That is very nearly the case, but not absolutely. It is a fact with the entire New England coast, where the Cape Cod region is the best lighted coast we have. The rule holds good along Long island and down past New Jerey and Delaware, but there is a little strip of about ten miles on the Maryland coast, off Chincoteague bay, where no light is visible. There is another dark strip of less than five miles a little further down the Maryland coast, and another of about the same length in North Carolina between Harbor Island Bar and Cape Lookout. This is because vessels must stand so far out to clear Cape Hatteras that lights there would be useless. Between Hatteras and Cape Florida there are several dark stretches aggregating perhaps fifty miles With these few exceptions a mariner sailing along the coast from Quoddy Head to Key West is never without a light."

Conneaut harbor is to have a new light. It will be located on the west pier and the structure will be similar to that at Ashtabula. The light will be in readiness for the opening of navigation next season. Work on the new government breakwater at Conneaut will also be started early next spring.

The Commissioner's Recommendations.

Although Mr. E. T. Chamberlain, United States commissioner of navigation, will retire with the present administration and will have little influence in the matter of shipping legislation on the new congress, some of his views, as contained in an annual report, just issued, may prove interesting. Notwithstanding his free ship views, in which he presents a lengthy argument, he advises an immediate extension of the act of 1892, under which the steamships New York and Paris were admitted to American registry and the steamships St. Louis and St. Paul were built in the United States. But under existing law, he says, it is impossible to establish on the Pacific a mail service even approximating our Atlantic mail service on equal conditions with those found necessary to the recent creation of the latter. The feature of his report is, of course, opposition to the Frye bill now before congress, to impose 10 per cent. additional discriminating duties on all cargoes brought into the United States by foreign vessels. This is prompted by the action of the recent republican national platform endorsing this measure. The commissioner urges that for over eighty years the United States have followed the policy of reciprocity in shipping, and declares that every other maritime nation of considerable rank has adopted and now pursues the same policy. Our total imports for 1895, he says, were valued at $731,969,965, of which $590,538,362 were brought in foreign vessels. The discriminating duty bill would, he adds, put an additional charge of $59,100,000 on our international exchanges, based on the figures for 1895, an amount approximately equal to our entire freight bills on imports and exports. The report quotes articles from our treaties with the thirty-five principal nations in the world, all of which, it is contended, must be abrogated at the expense of a disturbance of our trade relations with the world if the policy of discriminating duties is to be adopted by the United States. In arguing against the imposition of this tax the commissioner cites the enormous importations of tea and coffee, aggregating in 1895 $125,000,000, and points out that the proposed tax would be a tax on the consumers of those articles. Of coffee from Brazil $54,000,000 came in foreign vessels, and the proposed tax would equal $5,400,000, or sufficient, Mr. Chamberlain says, in coffee alone to subsidize steamship lines, including twenty-five steamers equal to the St. Louis and St. Paul, or a much larger number of the class required for South American, Asiatic and African trade. A considerable share of the report is given to the consideration of this question, and the commissioner reaches the conclusion that the policy of discrimination always has been, and always will be, thwarted by retaliation.

Another feature of the report is a discussion of the interest of the United States in the carrying trade of the Pacific. Attention is directed to Japan's action in establishing steamship lines to the United States, largely through co-operation with American capital. "We have," the commissioner says, "already seen the Americanflag almost wholly disappear from the mid-Atlantic, save as borne by the mail steamers of the American line, and the figures show that the carrying trade of the Pacific is slipping from us. Before it is altogether lost, congress should inquire into the conditions of Transpacific transportation. Within the last five years Japan's sea-going steel steamers have increased from thirteen of 27,701 tons to fifty-three of 106,383 tons, while the number of American steel and iron steamers on the Pacific coast is only forty-three of 68,625 tons."

WOODEN SHIP BUILDERS AND DRY DOCK MANAGERS.

Thomas Dunford. Joseph Wolter. Abram Smith. James Davidson. C. T. Morley. Henry B. Burger. H. J. Mills. George Quayle. W. W. Brown. A. Gillmore. Thos E. Miller. Simon Langell. James E. Davidson.

From Blue Book of American Shipping.

Retarders in Boilers.

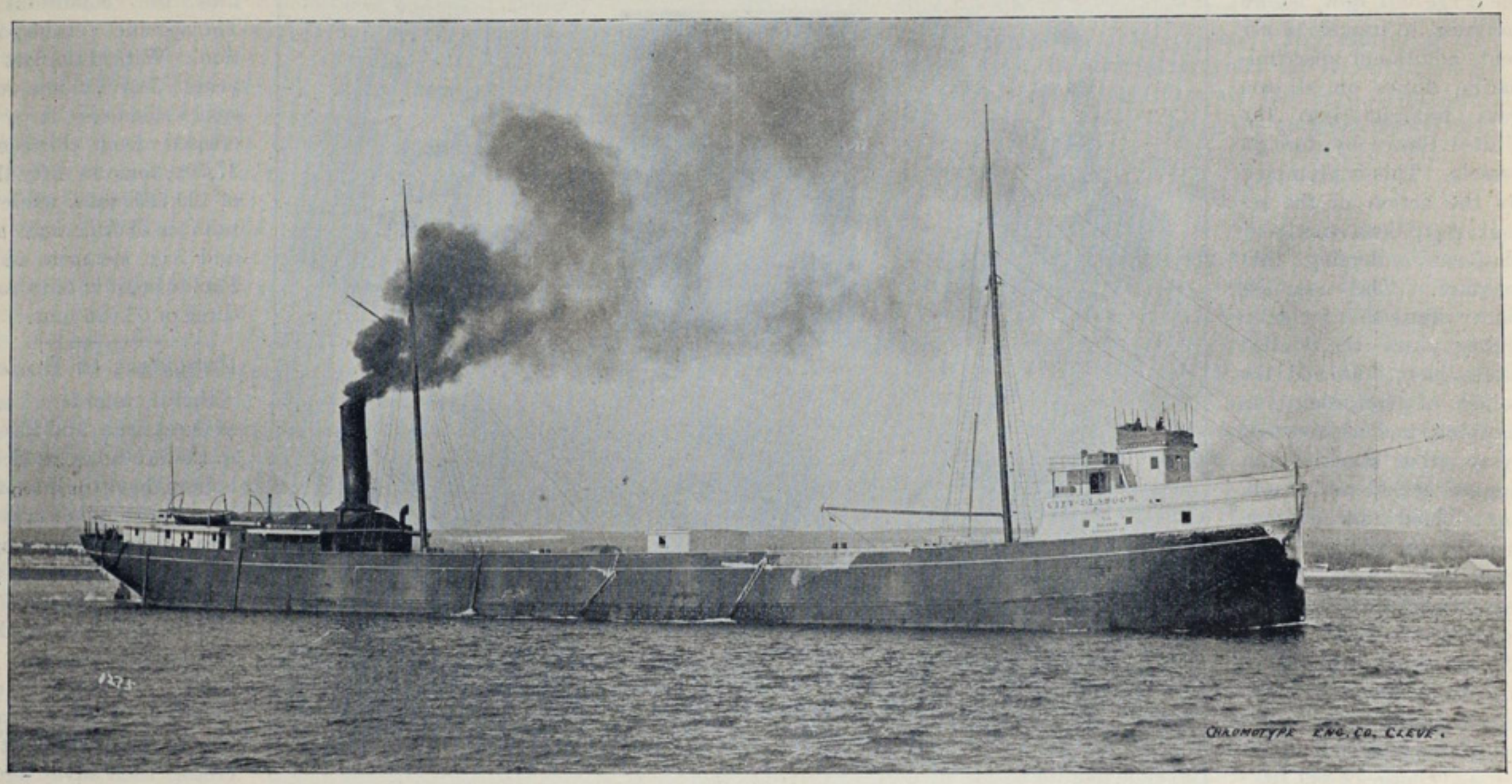
Spiral retarders, made of sheet iron and inserted in the fire tubes of Scotch boilers, have for some time been in use on lake vessels. The Dry Dock Engine Works of Detroit has used them in the boilers of all vessels to which they have fitted the Howden hot draft. They have even patented an improvement on the retarders that increases their advantages in cleaning the tubes. These retarders, alike to many other special devices, have met with opposition from some of the engineers, who claim that their advantages are more fancied than real. But it would seem that numerous tests made recently, in both stationary and marine boilers, have settled this question. In the November number of the Journal of the Society of Naval Engineers, Mr. Jay M. Witham presents several pages covering exhaustive trials of boilers with and without the retarders, all of them showing that the retarders are of value in saving fuel. As the result of a trial made on two Scotch boilers in the steamship Winyoh of the Clyde Steamship Co., plying between Norfolk and Richmond, Va., he concludes that retarders properly used, effect a saving in the use of coal; that they check the draft and their use is not advised except when it is strong; that they can be best applied when the draft is strong and the gases are high in the stack.

Advantages of Screw-Propelled Ferry Boats.

One of the papers read at the recent meeting of the Society of Naval Architects and Marine Engineers in New York dealt with trials of the screw-propelled ferry boat Cincinnati, owned by the Pennsylvania Railroad Co. and operating in New York harbor. The conclusion is that the screw-propelled boats will eventually supplant all of the side-wheel boats for ferry service, especially where certainty in the operation of the ferry is necessary, and where the comfort of the passengers is considered. The screw-propelled boats are more quickly maneuvered at landings, and in the winter they proceed through ice without interruption, when side-wheeled boats are very much delayed. The side-wheel is a more economical propeller for a ferry boat than the two-screw arrangement, but the advantages gained by the use of the screws are more valuable for the successful operation of a ferry than the amount saved in power.

The performance of the screw-propelled ferry boats now in service has been so satisfactory that, in providing the equipment for a new ferry from its terminal at Jersey City to Twenty-third street, New York, the Pennsylvania company decided, from the experience they had gained with the screw boats now in operation, to adopt the same method of propulsion for the new ones. The service will require more speedy boats— in fact, as fast as can be consistently operated in a harbor as crowded as the lower North river—and a speed equal to 15 statute miles per hour was decided upon as satisfactory, considering all conditions. To determine the power required to propel such a type of ferry boat at this speed, progressive speed trials were made with the Cincinnati, a screw-propelled boat, and observations were made, incidentally, to determine the efficiency of this system of propulsion. The trials were on a course of 5,600 feet, laid off on the New York shore of the North river. Runs were made on this course with and against the tide at speeds varying from 6 to 13 statute miles per hour; one series with the two screws in operation, one at the bow and one at the stern; one series with the bow screw removed and stern screw pushing, and one series with the stern screw removed and the bow screw pulling.

It was found that the ratio of the power put into the engine to the actual resistance of the boat at 9 miles per hour was 43 per cent. when two screws are in use; 60 per cent. when one screw was pushing, and 40 per cent. when one screw was pulling. The usual speed of the Cincinnati in ferry service is 11 miles per hour, and at this speed it requires 20 per cent. more power to propel the boat with two screws than with one screw pushing, and 69 per cent. more power to propel the boat with the screw at the bow than at the stern. If the same power could be put into one screw at the stern as is used by the two screws, the speed would be increased from 11 miles to 11.53 miles per hour. It is clear, therefore, that the bow screw is inefficient. When under way, it thrusts a column of water against the bow of the boat at a velocity equal to the slip ratio of the screw, and considerable power is absorbed through friction of the blade surface; but a ferryboat's bow becomes its stern at each succeeding trip, and it is therefore impossible to dispense with the forward screw. The screw at the bow, however, is useful, for one of the most desirable features in a ferryboat is the ability to start and stop promptly. Of the seven minutes required to go from landing to landing, two minutes are consumed in getting under way and stopping. Superiority in this respect is one of the reasons why a screw boat is preferable to a side-wheeler. A half minute is more easily gained in maneuvering by using screws than by increasing the speed of the boat when under way, and it is in stopping and backing that the forward screw shows its usefulness; it is able to thrust a column of water directly ahead that will not impinge against the boat. Several means have been suggested to overcome the loss due to the use of this forward screw when under way, the most fascinating of which seems to be to so design the screw that it will have very little backing power. If this could be done, the propelling effect of the forward screw would be small, and the power required to turn it would probably be only that due to the surface friction of the blades.



WOODEN STEAMER CITY OF GLASGOW.

Hull dimensions—297 by 41 by 20.5 feet. Owned in the office of Palmer & Co., Cleveland. Engines 20, 33 and 54 inches by 42 inches stroke.

If plans now under way at Buffalo are carried out, the plant of the Union Dry Dock Co. will be very busy for some time to come. The company is considering the construction of a new dry dock, 500 feet long, which will be suited to docking the largest of lake ships. It is also said that the management of the Union company contemplates the construction of another steel steamer, which will be a duplicate of the Ramapo. Work on the Standard Oil barge is being rushed with this end in view. Official announcement has been made regarding alterations in the Union line steamers Owego and Chemung. One pair of boilers will be taken out of each of the boats and their engines changed somewhat. It is said also that the steamers New York and Rochester will be rebuilt.

The Buffalo Forge Co., Buffalo, N. Y., has recently been awarded a contract for two 15 by 15 Buffalo center crank automatic horizontal class A engines, to be direct connected to Card generators for the Lakeside hospital, Cincinnati. The plant also involves the use of one 8 by 8 engine for belt connection to a smaller dynamo.

Coal Shipments from Lake Erie Ports.

The annual report of the chief inspector of mines for the state of Ohio, just issued, contains a summary of coal shipments from Lake Erie ports that seems to be nearer correct than any figures as yet published on this subject. It is noted, however, that the table of soft coal shipments gives no account of steamboat fuel taken on at Buffalo.

SHIPMENTS OF BITUMINOUS COAL BY LAKE FROM LAKE ERIE PORTS, SEASON OF 1895, INCLUDING AMOUNTS TAKEN BY STEAM VESSELS AS FUEL.

Lake Erie Ports.	To domestic ports.	To foreign ports.	Taken as fuel by steamers.	Total cargo and fuel.
Buffalo	8,000	.....	.....	8,000
Erie	137,675	3,003	102,953	243,631
Conneaut	70,482	70,982	24,609	166,073
Ashtabula	684,938	104,391	209,443	998,772
Fairport	285,977	.....	39,087	325,064
Cleveland	610,821	153,003	291,656	1,055,480
Lorain	248,891	13,816	14,953	277,660
Huron	190,140	860	17,000	208,000
Sandusky	208,376	3,730	11,028	223,134
Toledo	669,093	.....	47,006	716,099
Totals	3,114,393	349,785	757,735	4,221,913

COAL SHIPMENTS, ANTHRACITE AND BITUMINOUS, BY LAKE FROM LAKE ERIE PORTS, INCLUDING AMOUNTS TAKEN BY STEAM VESSELS AS FUEL.

Lake Ports.	1891.	1892.	1893.	1894.	1895.
Buffalo*	2,365,895	2,852,330	2,703,673	2,485,255	2,620,768
Erie*	586,990	567,028	625,023	711,928	727,184
Conneaut	.....	.....	23,184	89,023	166,073
Ashtabula	386,375	726,267	787,653	669,735	998,772
Fairport	66,914	114,738	234,089	300,923	325,064
Cleveland	1,016,487	1,728,831	1,512,308	997,513	1,055,480
Lorain	288,811	351,168	526,405	303,690	277,660
Huron	200,000	240,000	227,444	213,595	208,000
Sandusky	157,571	157,515	195,276	261,363	223,134
Toledo	947,288	858,935	938,533	836,232	716,099
Totals	6,016,331	7,596,812	7,773,588	6,869,257	7,318,234

* Buffalo shipments all anthracite; Erie shipments part anthracite and part bituminus; other ports ship only bituminous.

Ship Rivets and Riveting.

Naval Constructor J. H. Linnard presents a great deal of information about ship rivets and riveting in a paper read at the recent meeting of the Society of Naval Architects and Marine Engineers. He says among other things:

"In the French navy a very elaborate series of rules for spacing of rivets in butts, laps, etc., has been adopted. These include the general use of staggered riveting, uaually an irregular spacing of rivets in different rows, and, in special cases, the use of different sizes in the same joint. Some additional strength is doubtless thus obtained in the connections, but it does not appear worth the increased cost. The simpler methods of chain riveting have always been adopted by the British admiralty and in our own service. On account of the comparative weakness of the steel rivets used in our navy, it has seemed desirable to decrease the spacing. The requirements for rivet steel for the first steel cruisers were a minimum tensile strength of 60,000 pounds per square inch, and an elongation in 8 inches of not less than 23 per cent., with a shearing strength of not less than 50,000 pounds per square inch. The actual average results obtained from the tests were 64,740 pounds per square inch, and 27.41 per cent. elongation, with an average shearing strength of 53,695 pounds per square inch. The requirements for the recent ships have been between 55,000 and 62, 000 tensile, with a minimum elongation of 29 per cent. in 8 inches and a minimum shearing strength of 45,-000 pounds per square inch. I am not informed as to the average results actually obtained, but with the limits between which the tensile strength is required to be maintained, the average shearing strength can not exceed about 50,000 pounds. It seems very desirable to make a return towards the earlier specifications and sacrifice a little of the ductility in order to obtain increased shearing strength. A rivet steel for hull work, similar to the requirements of the present specifications for rivets for longitudinal boiler seams, appears very desirable. These requirements are between 58,000 and 67,000 tensile strength, with a maximum elongation of 26 per cent. in 8 inches. The maximum allowances of sulphur and phosphorus, which for hull rivets are .04 and .05 per cent. respectively, are for these boiler rivets .035 and .04 respectively, and with a metal of this character no difficulties should occur in the satisfactory driving of the rivets."

How Connors Settled the Strike.

A season of usual activity in grain is now drawing to close and Buffalo will show receipts of flour and grain that will probably be twice as large as any port in the world. It is certainly remarkable that an immense business of this kind should be handled without serious delays to vessels, and without any of the labor difficulties that have been common in this branch of the lake trade in the past. The contract system of dealing with this class of labor, which was inaugurated by W. J. Connors of Buffalo, has had much to do with settling these difficulties. Since Connors has grown wealthy and has assumed all the qualifications of a man of money, with a fast steam yacht and an enterprising daily newspaper at his command, some interesting stories are told of his dealings with the dock laborers. Only a few years ago he was called to Chicago and Milwaukee to help the line boat managers in settling difficulties with their men. In Chicago he was as successful as he had been in Buffalo, but in Milwaukee his first experience was not encouraging. After considerable difficulty he managed to get the men to work, and started back for Buffalo. He had traveled only part way home when his journey was cut short by a telegram informing him that the men whom he had left at work were all out again on a strike. He beat a hasty retreat, and on arriving at Milwaukee, went straight from the train to the dock, where he found the strikers lined up for his coming. Without inquiring as to the new cause of trouble, he pealed off his coat and announced in no uncertain terms that he could lick any man in the crowd.

This surprise was followed by a short period of silence and then one of the biggest of the longshoremen, the leader of the gang, stepped forward to meet the challenge.

Connors immediately took him to one side and whispered: "I'll give you $4 a day to be foreman. Now go and get that crowd to work."

No strikes have since been heard of among this branch of Milwaukee dock men.

A resumption of mining operations is announced from several points in the Lake Superior regions. A large force of men who have been idle since September have been put to work at the mines of the Pittsburg & Lake Angeline Co., Ishpeming, Mich., and it is announced from Hurley, Wis., that the Germania mine, which was a big producer in the early days of the Gogebic range, will again be wrought. This mine has been idle for five years. Capt. S. S. Curry of the Norrie mine is said to be connected with a new company that has been organized to work the mine, and which will be known as the Cuyahoga Mining Co. The fee is owned by the Northern Chief Iron Co.

Big cargoes have not been scarce during the past week. Here are a few of them: Steamer Queen City, 156,256 bushels of barley and 58,000 bushels of wheat, equal to 5,490 net tons, Duluth to Buffalo; steamer W. D. Rees, 130,848 bushels of barley and 65,690 bushels of wheat, equal to 5,111 tons, Duluth to Buffalo; steamer Sir William Siemens, 177,000 bushels of wheat, equal to 5,310 net tons; steel schooner Geo. N. Hartnell, 4,777 net tons of coal, Buffalo to Milwaukee; steel schooner Aurania, 4,754 net tons of coal, Buffalo to South Chicago.

Preparations are already being made for a general overhauling of engines and boilers of the Northern line passenger steamers North West and North Land, with a view to getting more satisfactory service out of them next season. Mr. Miers Coryell is now in Duluth arranging for work on the vsesels. He is accompanied by Mr. Arnold, who assisted him in Cleveland when engines and boilers were being built by the Globe Iron Works Co.

Col. Irvin N. Camp, well known engineer of Erie, died at his home in that city a few days ago. He was eighty years of age.

MARINE REVIEW

DEVOTED TO LAKE MARINE AND KINDRED INTERESTS.

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The books of the United States treasury department on June 30, 1895, contained the names of the 3,342 vessels, of 1,241,459.14 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1895, was 360 and their aggregate gross tonnage 643,260.40; the number of vessels of this class owned in all other parts of the country on the same date was 309 and their tonnage 652,598,72, so that half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1895, was as follows:

	Number.	Gross Tonnage.
Steam vessels	1,755	857,735.13
Sailing vessels	1,100	300,642.10
Unrigged	487	83,081.91
Total	3,342	1,241,459.14

The gross registered tonnage of the vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30, 1891	204	111,856.45
" " " 1892	169	45,968.98
" " " 1893	175	99,271.24
" " " 1894	106	41,984.61
" " " 1895	93	36,352.70
Total	347	335,433,98

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC. (*From Official Reports of Canal Officers.*)

	St. Mary's Falls Canal.			Suez Canal.		
	1895*	1894	1893	1895	1894	1893
No. vessel passages	17,956	14,491	11,008	3,434	3,352	3,341
Tonnage, net registered	16,806,781	13,110,366	9,849,754	8,448,383	8,039,175	7,659,068
Days of navigation	231	234	219	365	365	365

* 1895 figures include traffic of Canadian canal at Sault Ste. Marie, which was about ¼ per cent. of the whole, but largely in American vessels.

The steamboat inspection service is about the only government service of a shipping kind on the lakes that has been disturbed in the past on account of political changes. Changes among collectors of customs, United States marshalls, etc., do not concern vessel owners particularly, as no special knowledge of ships, or the management of ships, is required of these officials. But with the steamboat inspectors the conditions are different. They must be men of experience in the management of steam vessels and must be thoroughly acquainted with the duties of their respective offices. Civil service rules have been followed by the present administration to a gratifying extent, and it is to be hoped that if any changes are made by the new administration they will be in the right direction. But the claim of civil service in this branch of the treasury department does not seem to have lessened the number of candidates that show up with each new administration. There are two or three candidates in each of the local districts on the lakes, and it is announced that Capt. Charles Westcott, now mayor of St. Clair, Mich., will again seek the supervisorship in the Detroit district.

It is the general opinion among vessel men in Cleveland, who have been intimately acquainted with Mr. M. A. Hanna for a great many years, and who understood the motives that prompted him to undertake and secure the election of Major McKinley to the presidency, that he will accept no place in the cabinet. This opinion is prompted mainly by repeated proofs, even when interested only locally in politics, that Mr. Hanna's efforts were always accompanied by a strong spirit of Republican patriotism. His own utterances for a great many years past would indicate that he would himself regard the acceptance of office as inconsistent with his entire record in politics, whatever others may think of it. But what a blessing it would be to the lakes if he could be induced to accept the treasuryship portfolio. There are a few branches of the treasury department connected with the shipping of this country that would certainly assume some life and business-like methods under his management.

A correspondent suggests that in view of the success of the Detroit river post office, the Lake Carriers' Association would probably be justified in taking up the question of marine post offices at convenient points in the harbors of other large cities, such as Buffalo, Cleveland, Milwaukee and Chicago. The idea at these places is not to have a delivery to vessels, but to bring together at a dock office mail that is now left in the care of ship chandlers, grocers, butchers, etc., and much of which is very slow in reaching the people for whom it is intended. Offices of this kind would not, however, have anything like the patronage that has been accorded the Detroit river office, and it is doubtful whether the association, with many other pressing matters in hand, will care to take up this subject as yet. The demand for a service of this kind is bound to develop, however, and the question will very probably come up later on.

Governor-elect Pingree of Michigan is said to be interested in the question of securing some action of the government that will overcome the treaty regulations with Great Britain which prevent the building of war vessels on the lakes. He is said to have referred to this matter in a conversation which he had with President-elect McKinley at his home in Canton recently. Detroit's famous mayor has been given credit for a great many unique and sometimes creditable performances, but we doubt whether he can accomplish much along this line, as it is well known that Senator McMillan of Michigan, who is at the head of one of the biggest ship yards on the lakes, and who has no small amount of influence in Washington, attempted the job but dropped it on account of the difficulties which he encountered.

Chief Melville of the bureau of steam engineering, navy department, again directs attention in his annual report to the need of providing skilled officials to manage the high-power warships, which are now being built. He speaks of the number of engineer officers who have been retired during the past year for physical incapacity and the steadily increasing number of such officers on the retired list as demonstrating that the physical strain to which the officers of the engineer corps are subjected is too great. In former annual reports he has given what he believes to be abundant reasons for an increase in the number of officers of the corps. As time goes on and the number of ships and their power grow, the necessity for such an increase is, he says, intensified.

The National Board of Steam Navigation, made up largely of owners of Ohio and Mississippi river steamboats, have again decided upon an effort to secure changes in the libel law that will prevent irresponsible persons from tying up vessels on unjust claims. When attention was directed at the last meeting of the Lake Carriers' Association to unjust practices in connection with this law, it was said that an arrangement could be made with the federal judges in lake districts whereby the abuses complained of would be overcome, and the matter was referred to a committee, but nothing has since been heard from the committee.

Last year the United States canal at Sault Ste. Marie closed Dec. 11. The last boat to pass down was the steamer Linden, which locked through just before noon on the date named. On account of trouble experienced with machinery of the new lock, it is thought advisable to keep both locks running until the last boat is down this fall, to preclude any delay in case of accident to one or the other. During the winter both locks will receive a thorough inspection and overhauling. The pressure pipes of the old lock are leaking badly and they may have to be extensively repaired.

It was expected that a paper relating to the passenger steamer Grand Duchess of the Plant System, built at Newport News, would be presented at the recent meeting of the Society of Naval Architects and Marine Engineers in New York. The paper did not materialize, however, as the trials of the vessel were not completed in time for the meeting. There is general interest in this steamer on account of her high power and extensive equipment of Babcock & Wilcox water tube boilers.

It would seem that the Canadian government ought to soon make arrangements for further dredging in approaches to its canal and lock at Sault Ste. Marie, Ont. If channels of about 17 feet are provided in the Sault river next season, some dredging below and above the Canadian canal will probably be required, in order to enable that canal to retain the portion of Lake Superior business to which it is entitled.

Floating beds of seaweed, which are often met with in mid-ocean, have been observed to reduce the height of waves, like oil thrown upon the water. Taking advantage of this fact, a Frenchman has invented a thin cotton or silken net to answer the same purpose.

In General.

Capt. C. E. Benham is a candidate for collector of customs in the Cleveland district, and A. R. Rumsey, shipping master of the Lake Carriers' Association, wants to be United States marshall.

Ore shipments from Escanaba to Nov. 1 aggregated 2,120,405 gross tons, against 2,445,317 tons on the same date a year ago. From Gladstone the shipments to Nov. 1 foot up 188,935 tons, against 76,030 on Nov. 1, 1895. Thus the total from Lake Michigan to Nov. 1 this season is 2,309,358 tons, against 2,521,347 tons on the same date in 1895.

The Lake Michigan Car Ferry Transportation Co., which has been operating tow barges for two seasons in car ferry service between Peshtigo and Chicago, seems to be developing quite a large business in this line. The company has four car ferry barges and four tugs. Two large tugs are used for towing the barges on Lake Michigan, while the two smaller ones handle them in port. Although not all of the barges have been in service during the full season now closing, they have carried about 2,500 loaded cars between Peshtigo and Chicago. The boats will all be laid up in Chicago about Dec. 1.

One of the greatest things ever done for those who go down to the sea in ships was the establishment of the signal code of flags, for it matters not what tongue men may speak, if they can read their own they are able to communicate with another vessel. The crew of a vessel on the high seas a few days ago—from some far off port with an unpronounceable name—were starving rapidly. They hung out flags to that effect, which being seen by a passing steamer, were at once responded to with a boat load of provisions. The signal code establishes a universal language within certain limits.—The Engineer, New York.

The experiments at the New York navy yard in using liquid fuel in the third class torpedo boat of the Maine have been completed. The evaporative results were good, even at the highest rates of combustion, and it only remains to ascertain whether the stowage and carrying of this fuel can be so effected as to eliminate danger from the gas that may be given off, which is the chief objection to the use of any fuel oil other than petroleum refuse. The department has authorized the installment of this system in one of the tugs, in order to demonstrate its practicability under ordinary conditions of service. Preparations are being made to use fuel oil only in this boat, but if the results are satisfactory, its general use for tugs and torpedo boats will be introduced.—Army and Navy Journal.

Among the boats now under construction by C. D. Mosher of New York, are a steam yacht 122 feet long with a guaranteed speed of 33 knots (nearly 38 statute miles per hour), and an 80-foot steam yacht with a guaranteed speed of 30 miles per hour; also a yacht for Mr. F. P. Magoun with a guaranteed speed of 32 miles per hour; also a 75-foot yacht for J. Adolph Mollenhauer, which will have a very high rate of speed. Mr. Mosher has designed a large high-speed yacht some 200-feet long for which he is prepared to guarantee a speed of 34 knots, or nearly 40 statute miler per hour. The machinery consists of two sets of quadruple expansion engines, driving twin screws, four large boilers of the Mosher type and two independent fire rooms. The boat is subdivided by eight steel bulkheads into nine water-tight compartments, and has accommodations equal to any yachts of her size afloat; at the same time she will have the highest speed of any yacht in the world.—The Engineer, New York.

The navy department has awarded contracts for eight sets of 13-inch gun forgings to the Bethlehem Iron Co., and for six sets of 13-inch and one set of 12-inch gun forgings to the Midvale Steel Co., at their respective bids of 28 3-10 cents per pound. These forgings are for guns for battleships 7, 8 and 9, and for the reserve supply of guns for the navy. They will be assembled at the Washington gun foundry. The Bethlehem company is required to begin deliveries within 120 days, and the Midvale company within 160 days.

The Berlin Iron Bridge Co. of East Berlin, Conn., is putting up a new machine and blacksmith shop for the Robert Palmer & Son Ship Building Co. of Noank, Conn. The same company is furnishing a rolling mill for the Rome Brass and Copper Co. of Rome. N. Y.; also an iron roof for the new armory at Rutherford, N. J., and a new power house for the Plattsburgh Light, Heat & Power Co. of Plattsburgh, N. Y.

Queen of New York Yachts.

Ogden Goelet, one of New York's millionaires and a member of the New York yacht club, will soon bring to this country from the Clyde a twin-screw steel yacht that will be the queen of the many valuable pleasure craft now owned on the coast. The vessel was launched, a few days ago, by J. & G. Thompson, Clydebank, and named Mayflower. She is 275 feet on the water line, and 36 feet 6 inches moulded breadth, giving, with a mean draft of 16 feet 8 inches, a load displacement of 2,400 tons. The finish of the cabins is in panneled and polished oak and mahogany, from designs by Nelson of Paris. She carries a large refrigerating chamber and a steel fireproof magazine for the supply of ammunition to an armament of two breech-loading salute guns, a Maxim gun, a few racks of Lee-Metford rifles and other lethal weapons. A complete electric light installation is fitted, including two search lights, the engines and dynamos being in duplicate, and amongst her outfit of eight boats one electric and one steam launch is provided, while provision is made for carrying two 1½ raters. Her engines will embrace every modern improvement. They are of the four-crank triple-expansion type, and have been carefully designed to minimize vibration. The high pressure cylinder is 22½ inches in diameter, intermediate 38 inches, and each of the two low pressure cylinders 40 inches, the stroke being 27 inches. The two engines will collectively develop 2,300 horse power, which can be increased to 4,300 horse power by the use of forced draft, with which power it is expected that a speed of over 16 knots will be obtained.

Cargo and Speed Records—Lake Freight Steamers.

Iron ore—Coralia, Mutual Transportation Co. of Cleveland, 5,088 gross or 5,699 net tons, Gladstone to Ashtabula, draft of 16 feet 10 inches. From Lake Superior—Steamer Sir Henry Bessemer, Bessemer Steamship Co. of Cleveland, 4,637 gross or 5,194 net tons, Ashland to Conneaut, draft of 15 feet 9 inches.

Grain—Steamer Queen City, A. B. Wolvin of Duluth, 207,000, bushels of corn, equal to 6,210 net tons, Chicago to Buffalo, 16 feet 8 inches draft; steamer Maricopa, Minnesota Steamship Co., Cleveland, 191,700 bushels of corn, Chicago to Buffalo; steamer Zenith City, A. B. Wolvin of Duluth, 289,000 bushels of oats, Chicago to Buffalo. From Lake Superior—Steamer Queen City, A. B. Wolvin of Duluth, 156,256 bushels of barley and 58,000 bushels of wheat, equal to 5,490 net tons, Duluth to Buffalo.

Coal—Schooner Geo. N. Hartnell, 4,777 net tons of anthracite, Buffalo to South Chicago, draft 15 feet 5 inches; S. S. Curry, Hawgood & Avery Transit Co. of Cleveland, 4,535 net tons bituminous, Conneaut to Gladstone.

Speed—Owego, Union Line of Buffalo, Buffalo to Chicago, 889 miles, 54 hours and 16 minutes, 16.4 miles an hour; Centurion, Hopkins Steamship Co. of St. Clair, Mich., Buffalo to Duluth, 997 miles, 65 hours and 10 minutes, 15.3 miles an hour.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store in regular elevators at the principal points of accumulation on the lakes, Nov. 21, 1896:

	Wheat, bushels.	Corn, bushels.
Chicago	15,044,000	5,106,000
Duluth	3,890,000	2,000
Milwaukee	391,000	3,000
Detroit	469,000	23,000
Toledo	943,000	218,000
Buffalo	1,998,000	746,000
Total	22,735,000	6,098,000

As compared with a week ago, the above figures show, at the several points named, a decrease of 1,352,000 bushels of wheat and 856,000 bushels of corn.

Sickel Bros., steamship and insurance agents of No. 234 La Salle street, Chicago, announce that they have been appointed western managers for Johnson & Higgins, insurance brokers of No. 69 Wall street, New York.

If we did not get your boat in the list of sixty which we had photographed in the Detroit river, we can get a picture of her if she passes the Sault in daylight.

Stock Company to Control Erie Canal Boats.

Erastus Wiman has been visiting lake cities within the past week in the interest of his scheme to form a stock company for the purpose of buying up all of the better class of wooden vessels on the Erie canal and operating them with more system than has attended their management under several hundred owners. As outlined by himself, Mr. Wiman's plans seem more practical than the statements contained in newspaper dispatches regarding the proposed combination. He has talked with Capt. James Davidson of West Bay City, and other builders regarding the cost of constructing a large number of wooden canal vessels and he seems to be very well posted as to the disadvantages under which the canal boatmen are working. It is not Mr. Wiman's intention to attempt the use of the canal boats for lake navigation, even on Lake Erie. His aim is, first, organization of the canal interests by consolidation and new equipment; second, the creation of responsibility to furnish an undisputed bill of lading; third, to provide improved terminal facilities at New York and Buffalo. To a Detroit Free Press reporter Mr. Wiman said:

"My plan is to have the stock company composed of all Erie canal boatmen who wish to enter it and also of men who will furnish new capital, the first aim being to establish a commercial standing for men in the business. The Erie canal has been a dead duck for many years. The boatmen have been starving, with but small intermissions, simply because they have never pulled together in the terrible fight which the trunk lines have waged against them. Last year the canal carried 900 barrels of flour to the seaboard against the railroad's 11,000,000 barrels. The traffic of the canal has been cared for by 500 owners of canal boats and the most of these boats are the sorriest old things known to man. The principal reason for the loss of business to them was the inability of the northwestern millers to furnish to their banks through bills of lading by canal to the east on which to borrow money necessary to carry on their business. We will say that Pillsbury, for instance, makes 20,000 barrels of flour today. If this flour went by Erie canal it would have to be divided —with the present equipment of boats—among a dozen boatmen. The banker would have to look into the financial and physical ability of these boatmen to carry the flour before he would advance a cent on it, and at the end of several days he would find that the boat traffic would be very uncertain, and he would refuse to loan the money. Even if he were willing to loan it the miller and himself could not stand the delay of inquiry and the still greater delay in getting it to its destination. For this reason and because the railroads can carry it cheaper the canal has lost all the flour business, and most of the general traffic besides. I propose to organize these men into one company that shall be a big concern, with large capital, and a high commercial rating, where they now have none. It is to be chartered by the State of New York. It shall have an equipment of wooden boats in tows that shall be strictly modern. No, the steel canal boat is too much of an experiment to suit me, and besides I am not yet ready to go into the business of lake and canal transportation by the same boats. I have been figuring with James Davidson of West Bay City and with other lake builders to build these boats, but have closed no deal as yet. I would make up a tow of five consorts and one steamer at a time. The steamer would push one consort on ahead and would tow four others, which would float along side by side, in twos. That, to my notion, is the most feasible style of canal propulsion. I do not favor electricity. It is not a reality as yet in the canal business. Each tow would have a capacity of 15,000 barrels of flour, and would make the trip from Buffalo to tidewater in six and a half days. The average time of the railroads in getting from Cleveland to New York for one year was twelve days, because of the delays on account of congested traffic. The congestion of cars in New York last winter was simply dreadful. The delay of flour laden cars alone at one time would have made them into a train thirty miles long. Furthermore, every car of flour delivered in New York costs $12 in lighterage, and this the canal saves entirely. This is equal to 6 cents a barrel—it equals a dividend on the sum of $8,000,000 for which a certain big flour-milling plant was sold to an English syndicate. This saving will be effected in the canal businses by terminals at both Buffalo and New York and free transfer storage facilities for thirty days to all shippers ofwhatever nature.

"The people of New York city and state will aid this project in every way possible. They realize that the state, city and canal have been losing commerce because of its diversion to southern points by the enterprising western railroads, these southern points being Galveston, New Orleans, Newport News and Baltimore, and Philadelphia has taken some of it, and this galls the New Yorker. The people of New York will grant terminal privileges that not even the railroads can prevent. They showed this last winter when they voted $9,000,000 for improvement of the canals. They are anxious to see these waterways built up to something that will bring back their old standard of prosperity.

"Of course we expect opposition from the railways, as we expect when our plans are matured that the cost of moving flour and other products to the seaboard by water will not be more than 1 mill per ton per mile. The Pennsylvania company figures that the cheapest at which the railroads can carry it is 5 mills, and of course they are and have been carrying it for several times that amount. This movement of commerce to the sea is the greatest, and is of more importance to the people of this country than any that is before the consideration of man. I figure that in the first year, with the improved canal, we would carry 900,000 barrels of flour; in the second year 2,000,000, and in the third 6,000,000. This last figure is more than 50 per cent. of what the railroads are carrying, but at the end of three years the country and its traffic will have grown to much greater dimensions. I do not see how the railroads could, anyhow, hurt us by cutting rates. According to the agreement among themselves, in the form of a joint traffic association—which is a pool of earnings on an equitable basis that enables all to live—their rates are set to a certain standard, and this standard gives them a fair profit over and above operating expenses. If this is cut they will be down to a starvation basis, and then the association would go to pieces and the best of them would so feel the effect of competition among themelves, aided by competition from us, that some of them, at least, would be ruined. They might hurt us by ordering the western roads to refuse to deliver to us.

"Enormous forces are at work in favor of this scheme. The entire northwest is heartily in accord with it. Canal boatmen are willing to enter into anything that promises relief from the depression through which they have lived. Neither the millers nor the farmers have made a cent in the last five years, with the exception of the present little spurt. The reasons for it are plain. It is due to competition from the Argentine and other countries, from which the wheat and other products are shipped at the edge of the continent, with little or nothing to pay in the way of freight or port charges, with both of which the American farmer and miller are badly handicapped."

Miscellaneous Matters.

The new Cleveland Insurance Co., which was incorporated a few days ago by Goulder & Holding, Cleveland attorneys, will have a capital of $200,000 and a surplus of $200,000. Among names attending the incorporation are J. J. Sullivan, M. A. Hanna and L. E. Holden. The company will undoubtedly be very strong financially. It is the intention to do a marine business next year but the beginning will be in fire insurance.

It is unfortunate that the steamer Kearsarge, which struck in the Sault river, Wednesday, should meet with an accident at the tail end of the season. She was bound down on her twenty-seventh trip with package freight from Lake Superior. This record is in itself the greatest ever attained in the package freight trade on the lakes, but the Kearsarge would have made twenty-eight trips if she had not met with the accident. She may yet make another trip.

The big German steamship companies seem to be ordering new vessels along wholesale lines. Now it is announced that the Hamburg American Steam Packet Co., following the other big lines, has let contracts for four large steamers. Blohm & Voss of Hamburg, and another German firm, are to build one steamer each, while Harland & Wolff of Belfast are to build two. Harland & Wolff will receive $700,000 each for the vessels, which are to be 500 feet in length by 62 feet beam, and to have a deadweight capacity of about 12,000 tons.

Secretary Herbert seems to be encouraging the plan of sending young naval constructors abroad to complete their education in naval architecture. He has just arranged matters so that Cadet Wm. G. Grovesbeck, a young man who entered the naval academy from Indiana, goes to the University of Glasgow. Mr. Grovesbeck is the sixth man selected from his class to go abroad for higher education of this kind. Of the six, three are at Glasgow, two at Greenwich and one at Paris.

IF YOU HAVE MONEY TO BURN

You can burn it in the boilers of your steamers without knowing it until the fuel bills come in. If not you will be interested in

AN INVESTMENT THAT PAYS 20 PER CENT.

Take all your fuel bills for the season and add up the amounts. If you have a modern steamer divide the total by 5, and the result will be

THE AMOUNT OF MONEY YOU "BURNED" THIS SEASON,

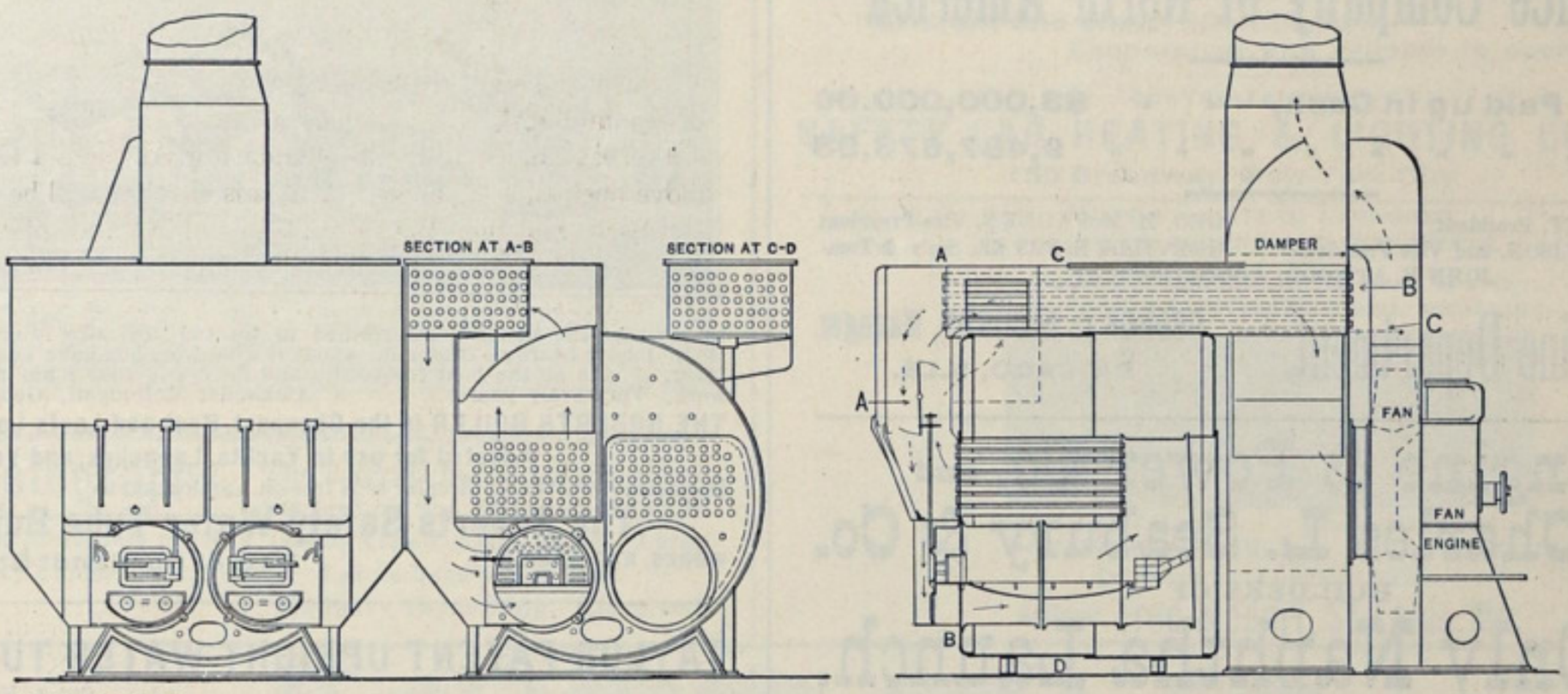
And the amount you can save next season by having your steamer equipped with the

ELLIS & EAVES SYSTEM OF DRAFT.

If you are interested in reducing the fuel consumption of your steamer to the lowest possible point, divide the total of the season's fuel bills by 3, and after looking at the result figure how much you can afford to pay to have your boilers retubed with

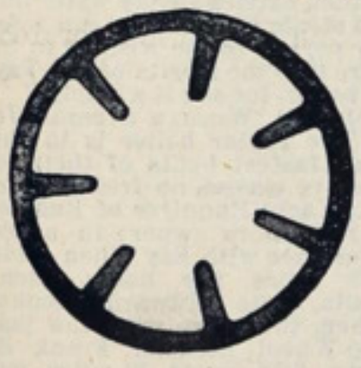
SERVE RIBBED TUBES

In addition to having the Ellis & Eaves system of draft. **The draft will save 20 per cent. of the fuel and the tubes from 10 to 15 per cent. additional.**



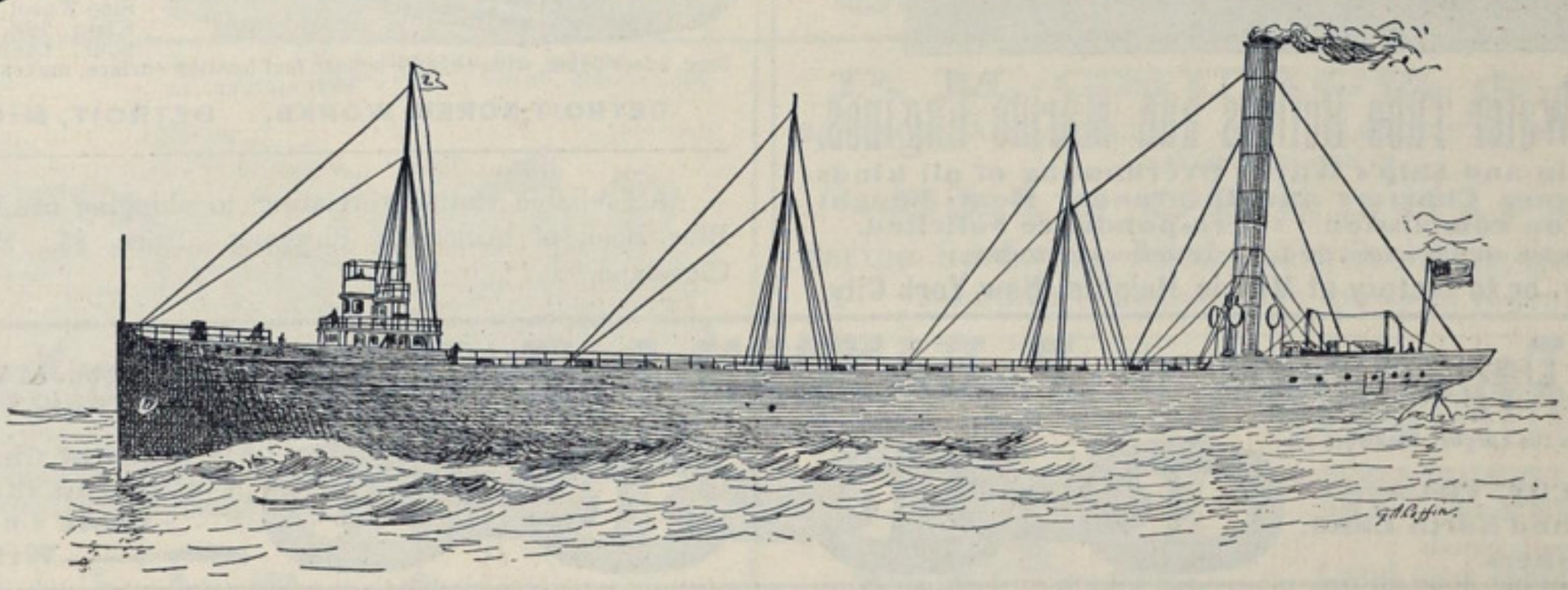
IF YOU ARE SKEPTICAL

You can refer to a table on pages 196–97 BLUE BOOK OF AMERICAN SHIPPING, which gives the coal consumption of ten modern lake steamers an average of **2.22** pounds per horse power per hour.



THE TEST OF THE STEAMER L. C. WALDO,

See MARINE REVIEW Oct. 22, fitted with the ELLIS & EAVES DRAFT, shows a consumption of **1.79** pounds—a saving of **20** per cent. with plain tubes. With SERVE TUBES and subtracting for auxiliary machinery, this can be reduced to **1.5** pounds, a saving of 33⅓ per cent. The simplicity of this system of draft and the construction of the tubes will commend themselves to the most practical ship owners, builders and engineers, when it is known that it consists merely in making the natural draft stronger—not forcing but inducing it.



STACKS 200 OR 300 FEET HIGH.

Would give somewhat similar results. The SERVE TUBE is even more simple. SEE THOSE RIBS—they present 70 per cent. more heating surface than plain tubes. Smoke is unconsumed carbon, the essence of the coal. Watch the smoke stack of your steamer.

WHY PAY FOR THE SMOKE WHEN YOU CAN BURN IT? **For full Information and prices write**

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Bertram's Oil Polish. The Marine Polish of the World.

For Brass and all Metal Surfaces it is unequalled. It is cheaper, requires less work and retains it brilliancy longer than any metal polish made. Acknowledged the standard of excellance by the U.S. government in the marine departments. For sale by ship chandlers and engineers supplies stores. **BERTRAM OIL POLISH CO.,220 & 22 State St.,BOSTON,MASS.**

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DUNHAM TOWING & WRECKING CO.

15 TUGS AT CHICAGO, Chicago Telephone, No. 852 Main.

4 TUGS AT SO. CHICAGO, So. Chicago Telephone, No. 63.

Steamers when outside wanting our tugs, blow one long and one short blast of the whistle.

TUGS, STEAM PUMPS, DIVERS, HAWSERS, LIFTING SCREWS, LIGHTERS, Etc., for Releasing Stranded or Raising Sunken Vessels,

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Private Telephone on 16th St. Ry. bridge, and at Life Saving Station, South Pier. **CHICAGO, ILL.**

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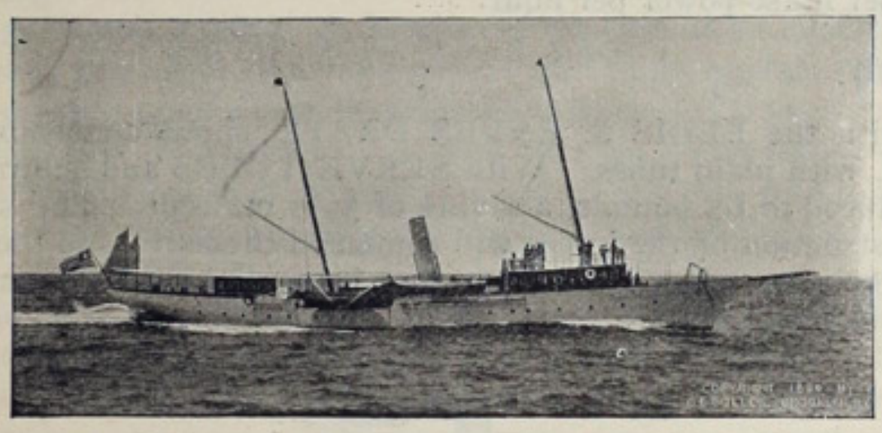

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Storage Basin and Ship's Ways. Overhauling of all kinds promptly done. Charters and Insurance. Boats bought and sold on commission. Correspondence solicited.

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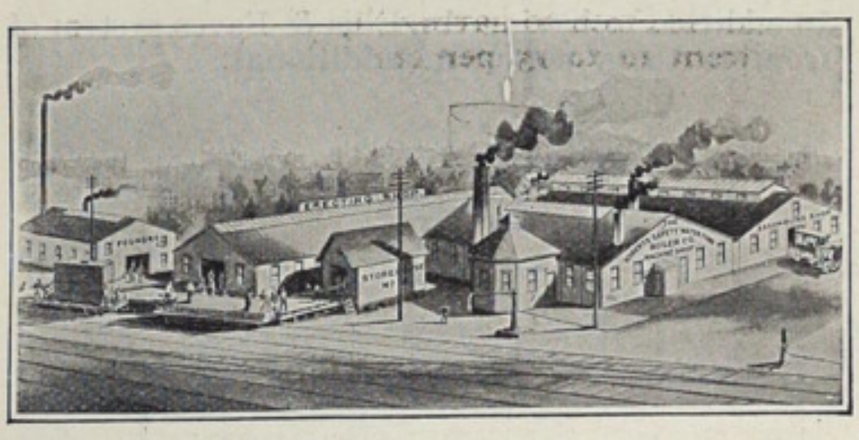
PRODUCERS AND SHIPPERS.

Choicest Grades of YIOUGHIOGHENY COAL

FOR STEAMBOAT FUEL.

Lighter in Cleveland Harbor of 400 tons capacity.

CLEVELAND DOCKS. just north of Main Street bridge.
SAULT RIVER DOCK. just above Detour, known as Watson dock



Office of AMERICAN STEEL BARGE CO.

West Superior Wis., Oct. 31, 1895.

The Roberts Safety Water-Tube Boiler Co., 39 and 41 Cortlandt St, New York.

Gentlemen: Replying to yours of the 28th I am glad to say that the boiler you furnished us for tug "ISLAY" is giving entire satisfaction. I have heard no complaint about it whatever, but have heard a good deal in its favor. I ride on the boat frequently and must say that I am much pleased with its work. Very Truly yours, Alexander McDougall, General Manager.

THE ROBERTS BOILER is the Cheapest, Best and Lasts Longest.

Adapted for use in Yachts, Launches, and Vessels of all Kinds.

Handsome Illustrated Circular sent free on application to

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WORKS, RED BANK, N. J. **39 & 41 Cortlandt St., NEW YORK.**

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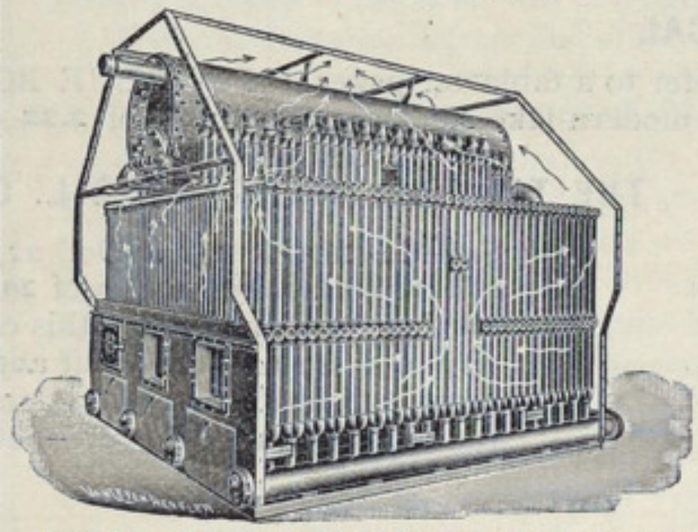

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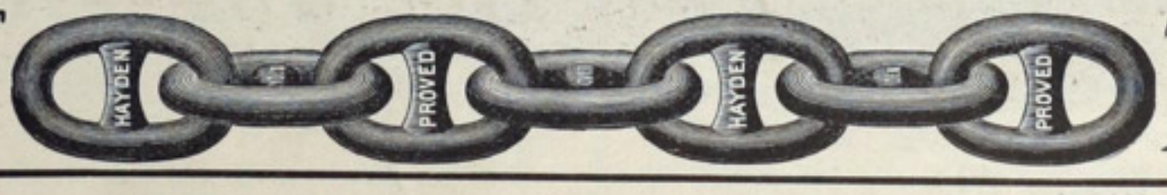

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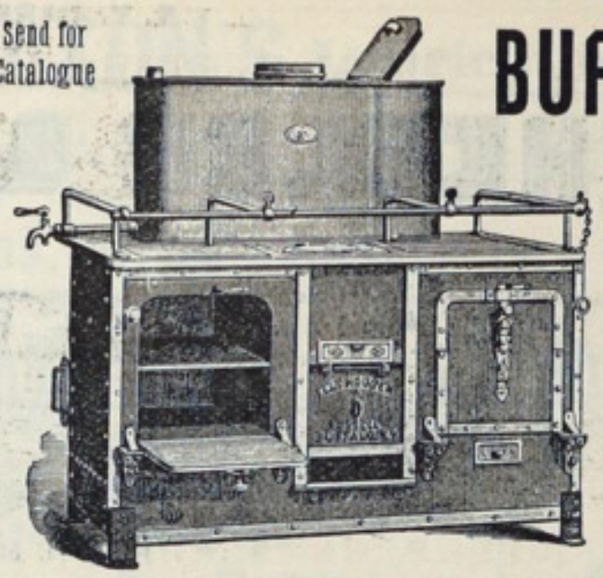

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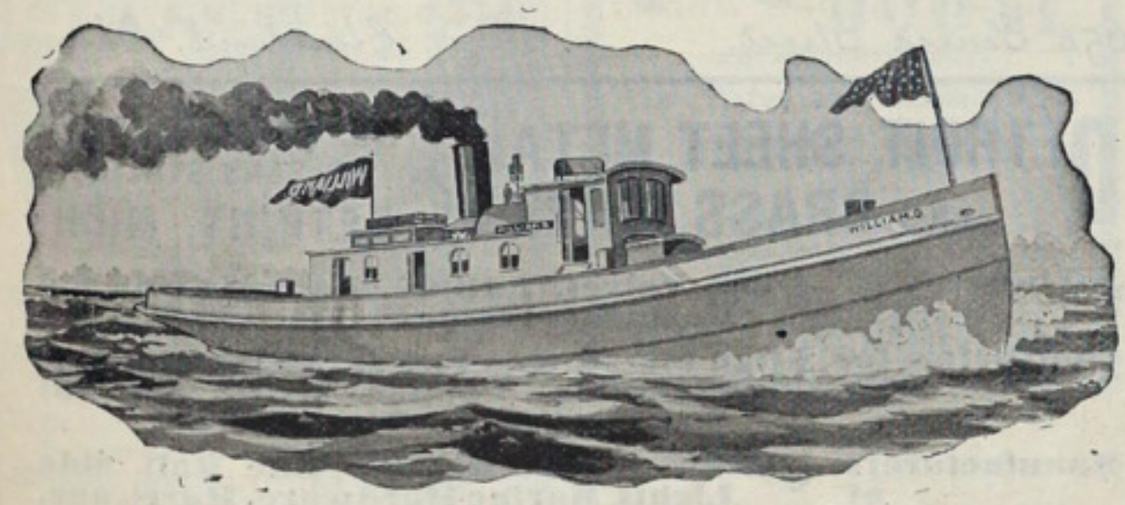

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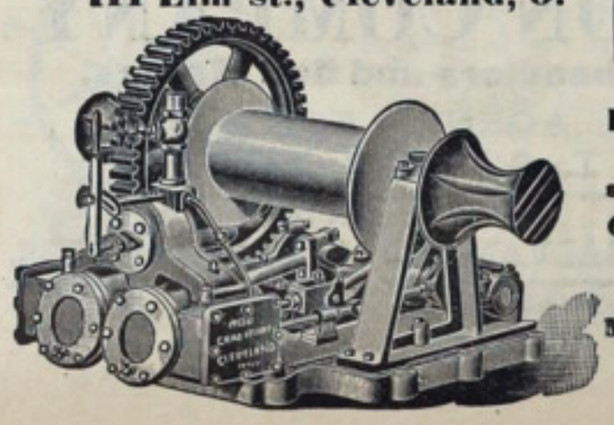

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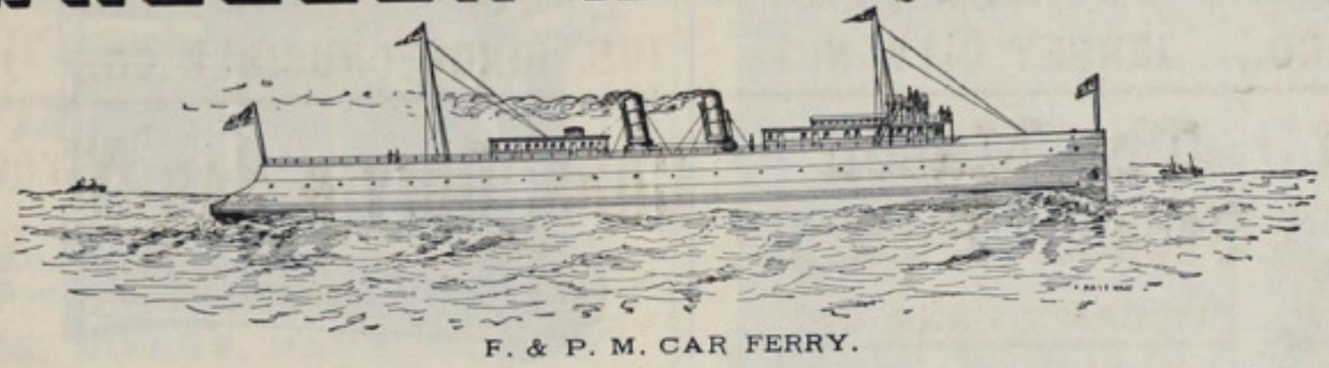

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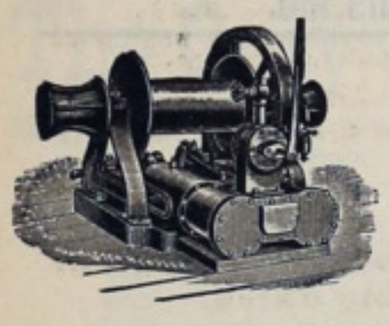

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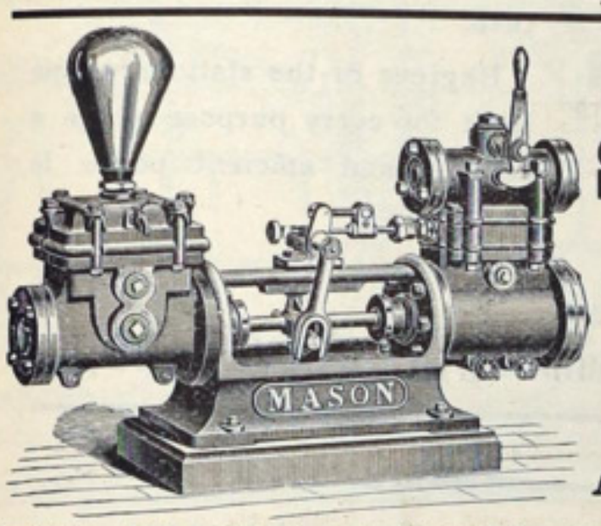

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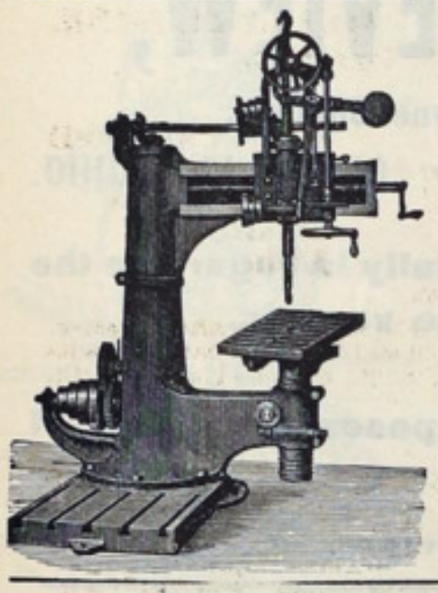

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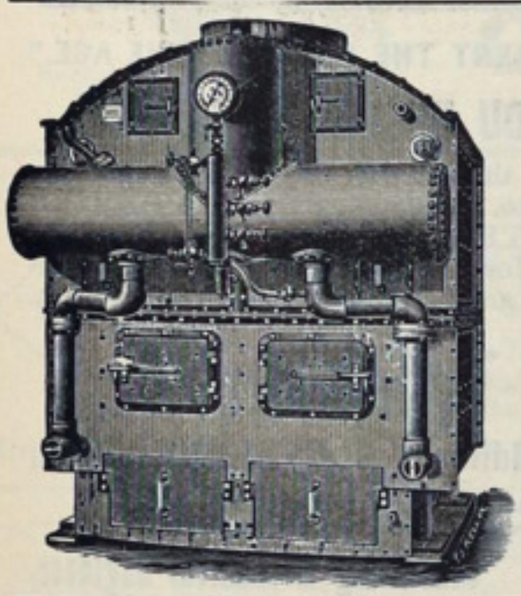

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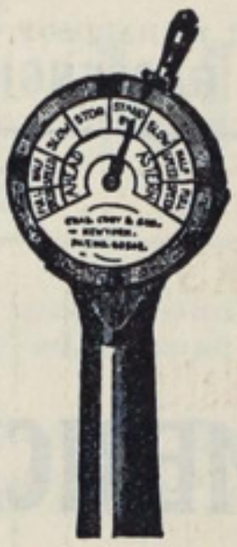

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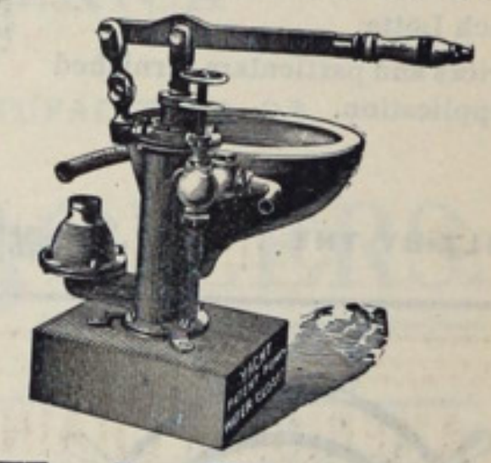

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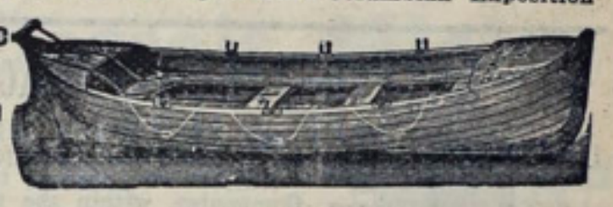

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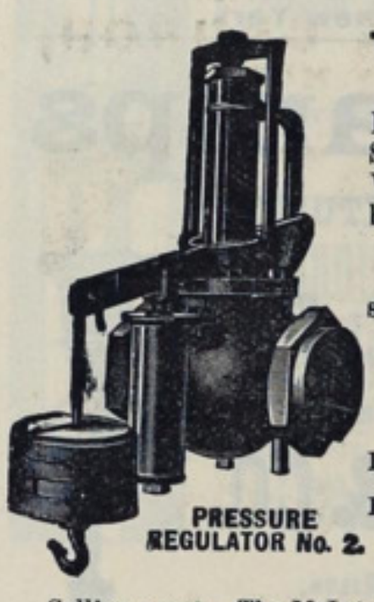

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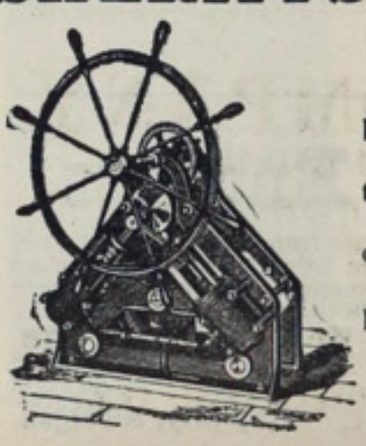

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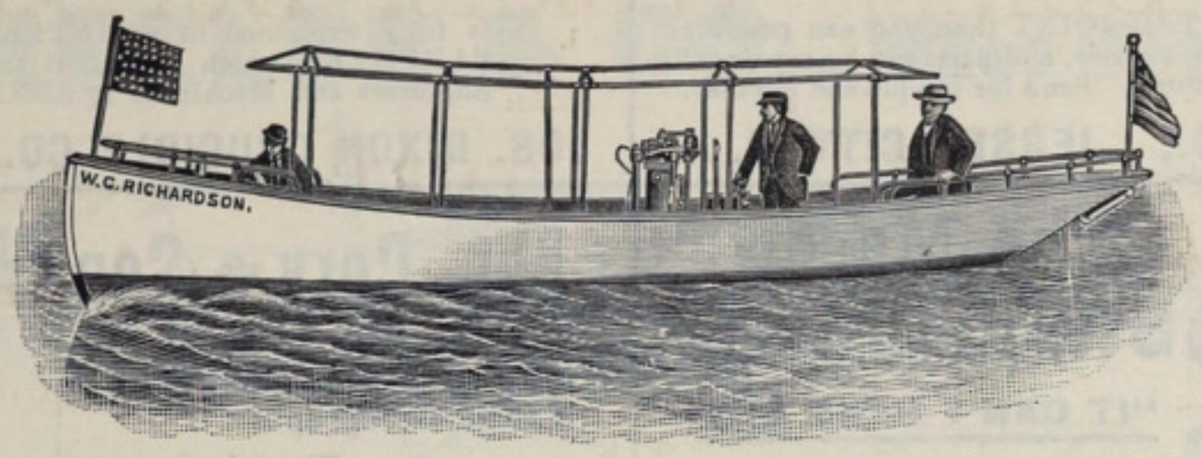

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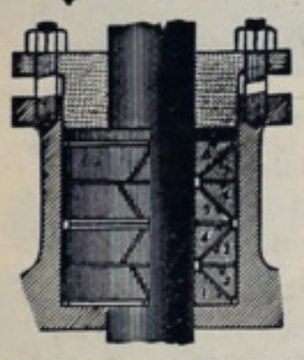

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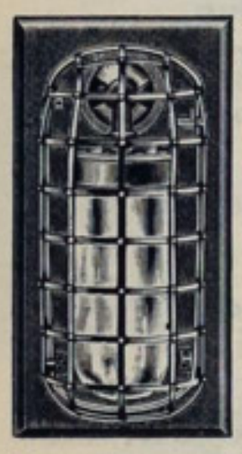

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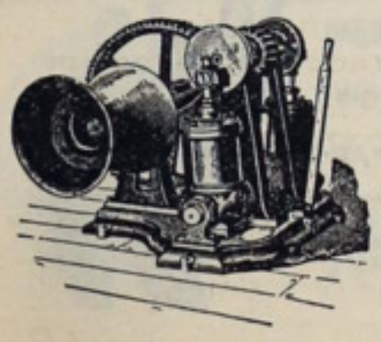

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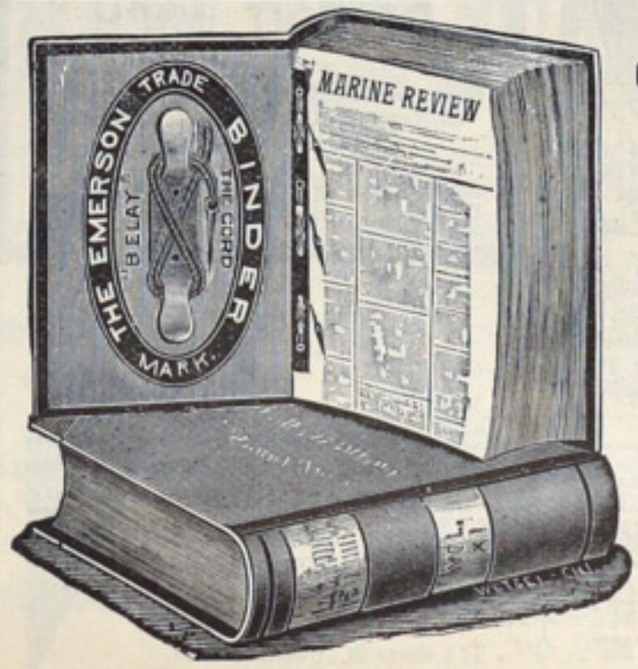

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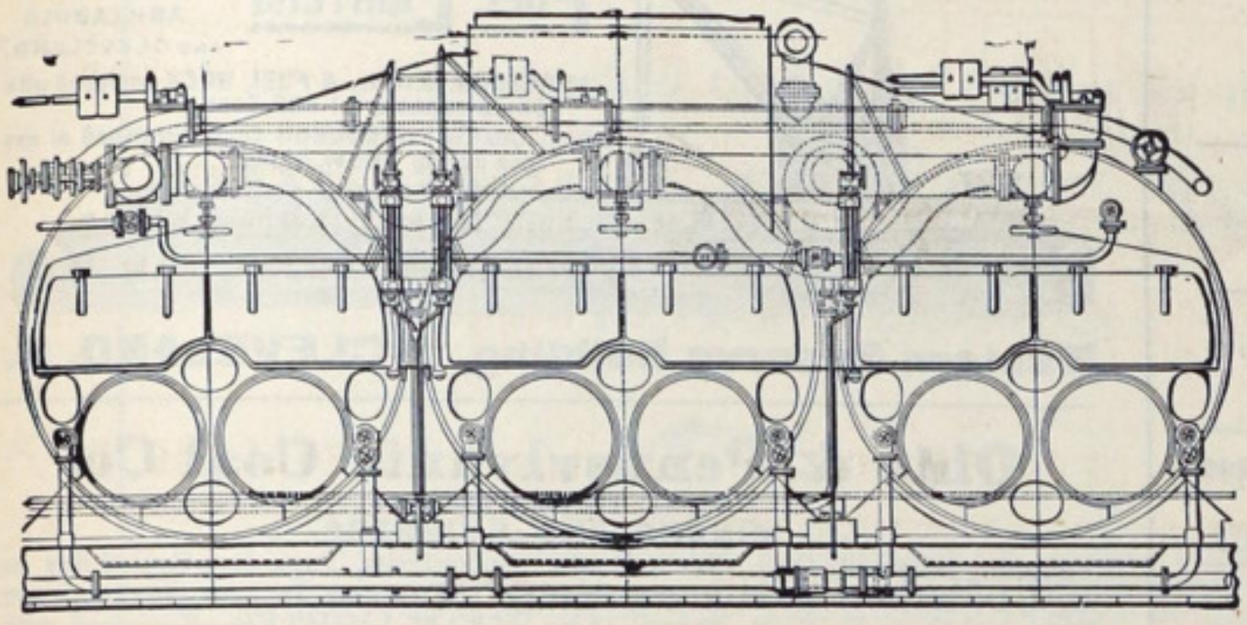

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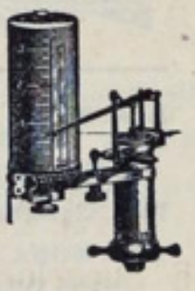

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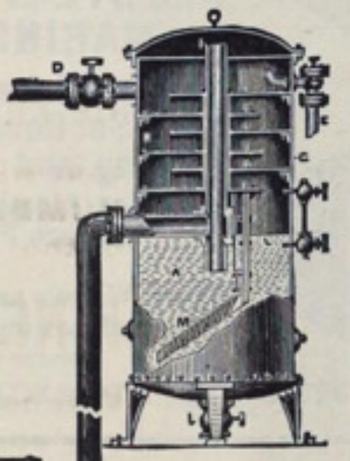

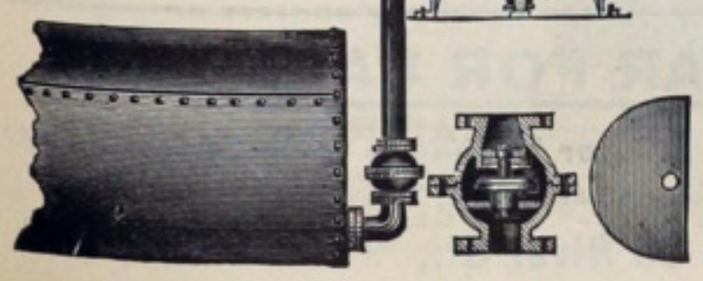

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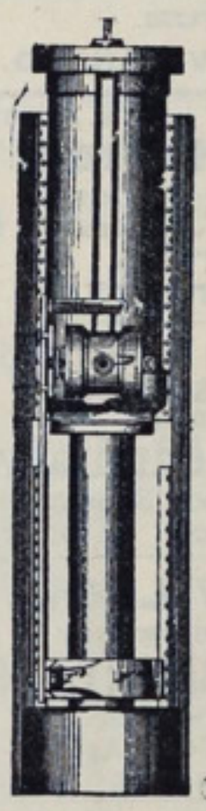

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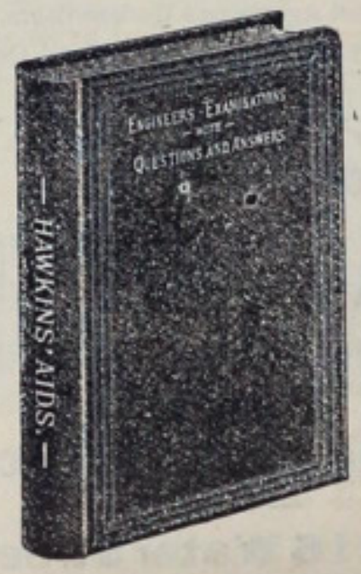

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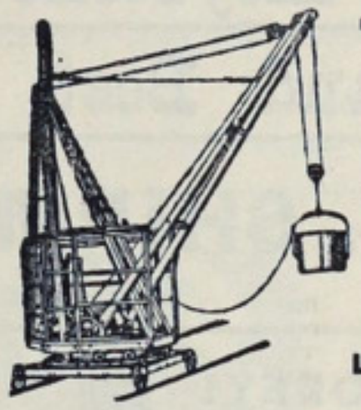

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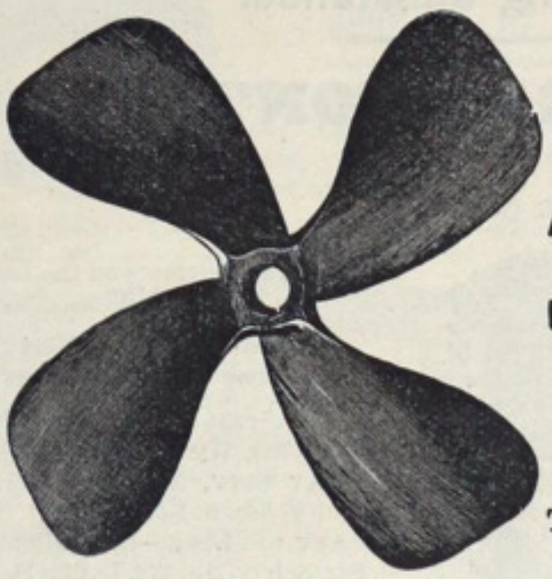

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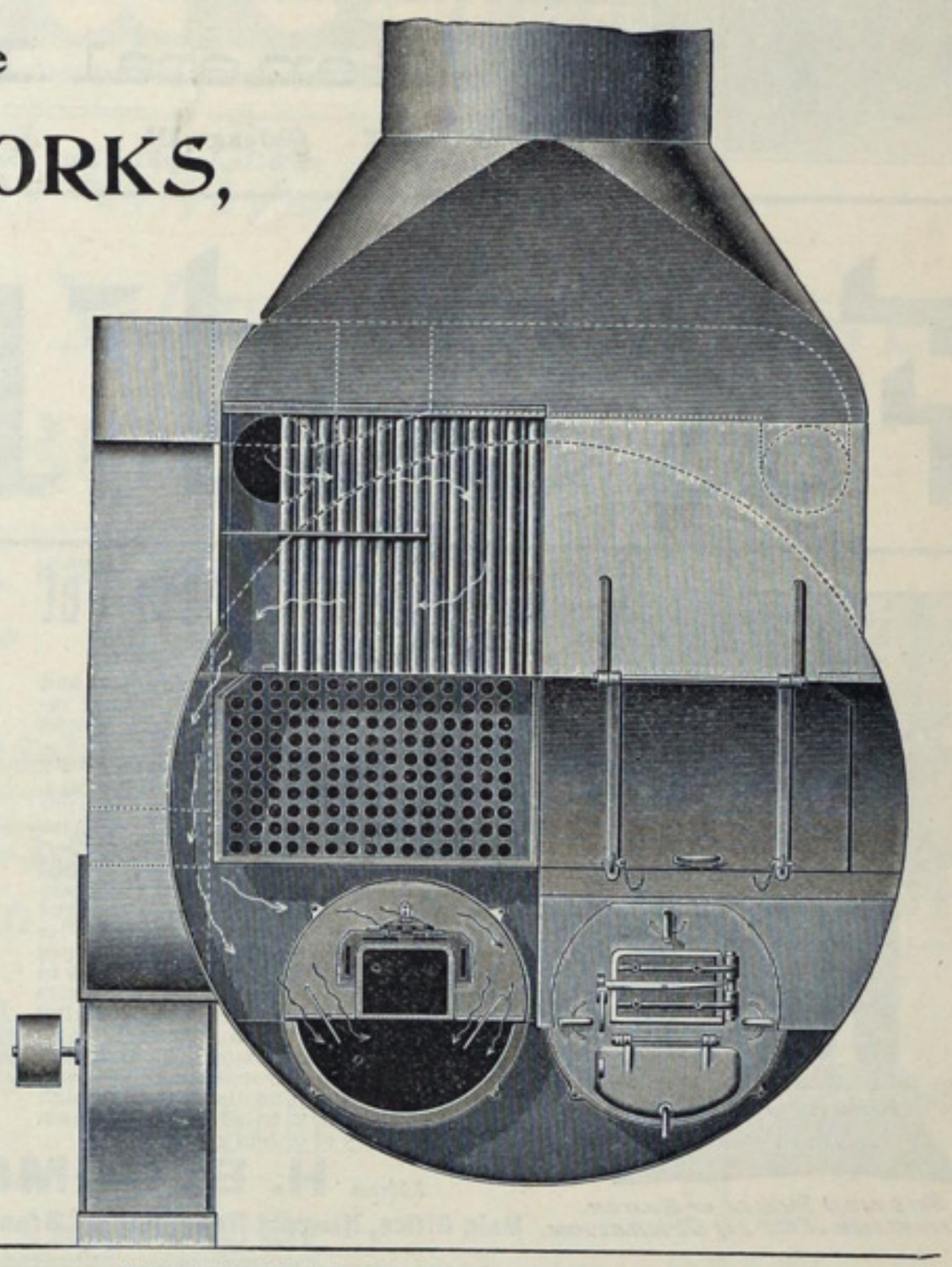

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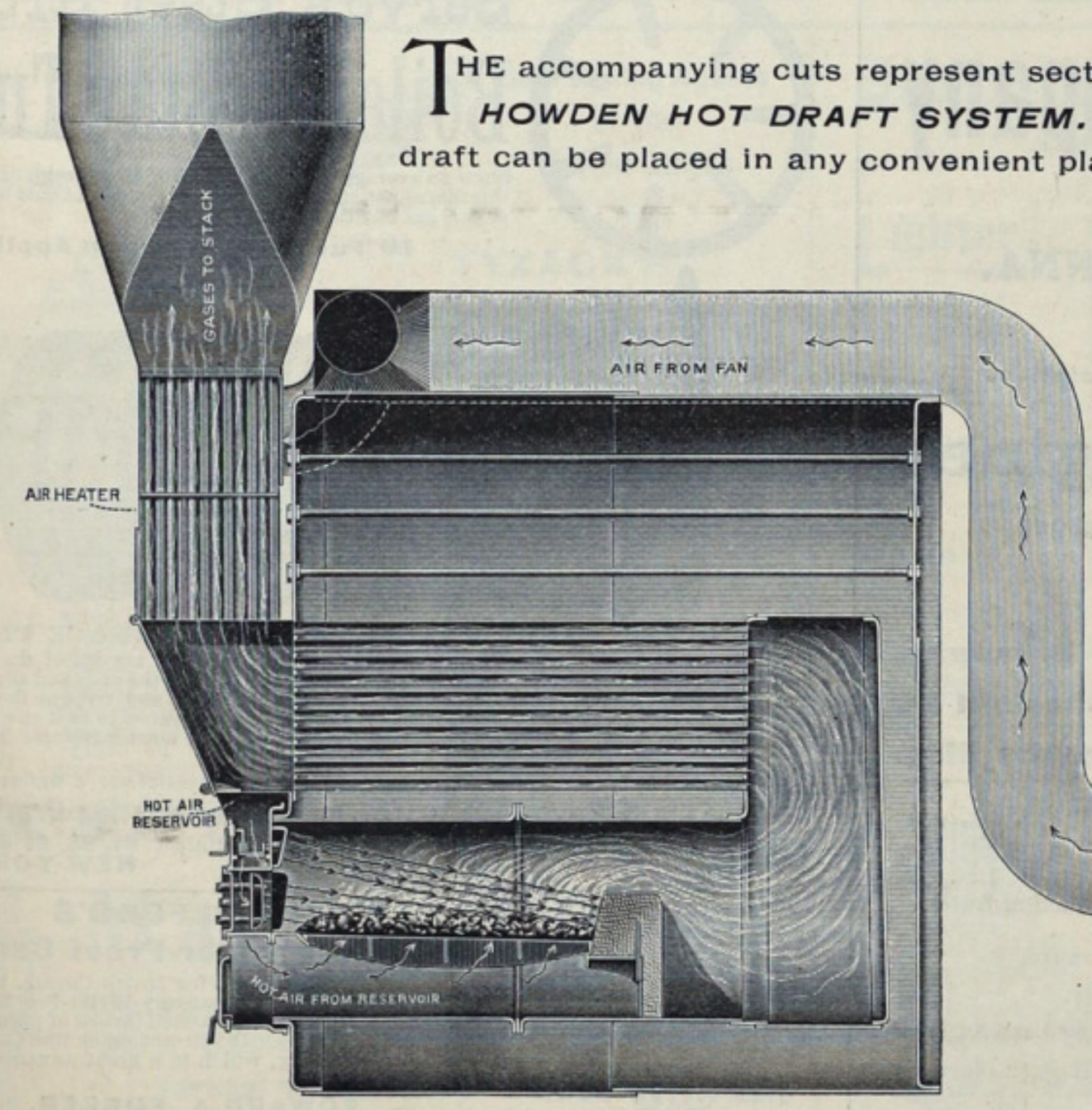
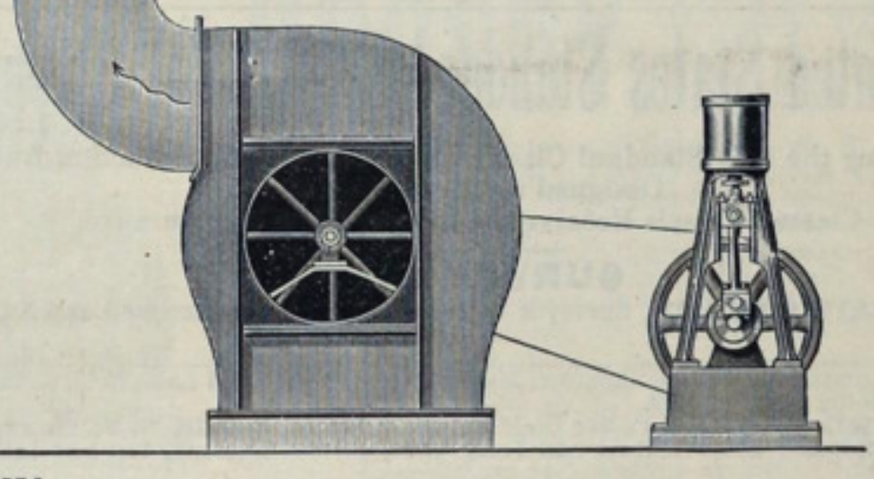
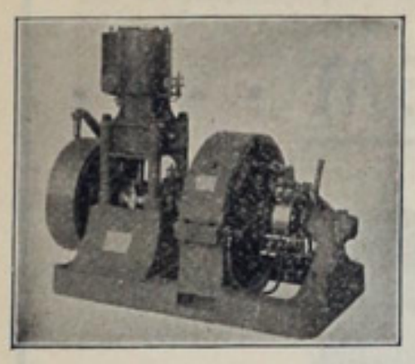
The Howden system has a total installation in all parts of the world of 1,212,800 horse power.



SECTIONAL VIEW.

THE accompanying cuts represent sections of a single boiler equipped with the ***HOWDEN HOT DRAFT SYSTEM.*** The engine and blower for supplying draft can be placed in any convenient place, preferably in the engine room. The hot air from engine room is taken in and forced through the air duct to air heater, where it is heated by passing among vertical tubes, through which the escaping gases from the boiler pass. The heated air is led down in ducts around breeching and delivered under and over grates in sufficient quantities to get perfect combustion. The arrows in accompanying views illustrate the passage of air from blower. This is in general the principle of the **HOWDEN SYSTEM.**





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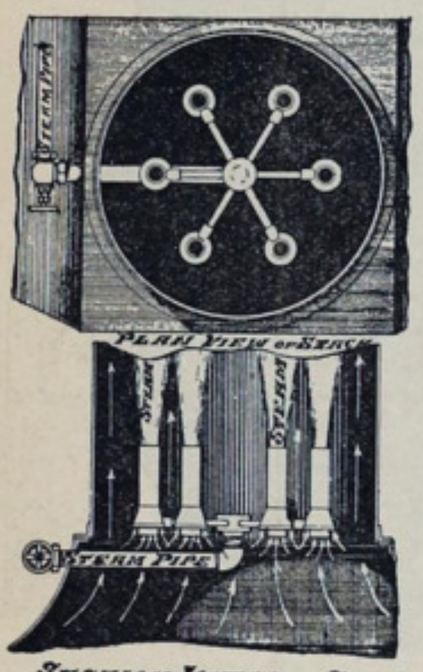

SECTION VIEW OF STACK SHOWING JET IN OPERATION.

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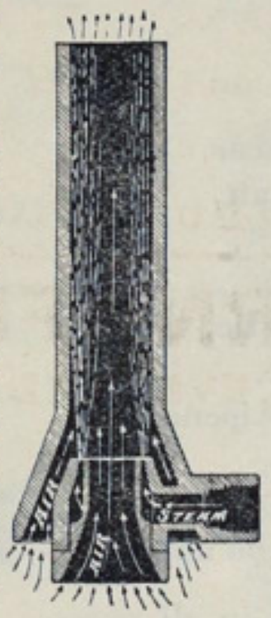

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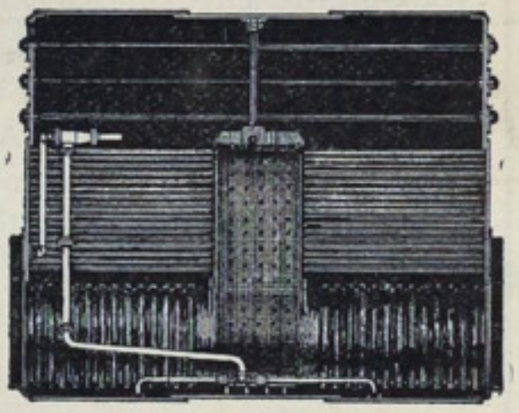

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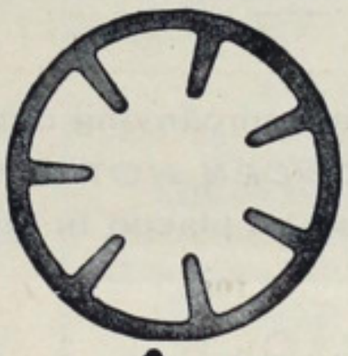

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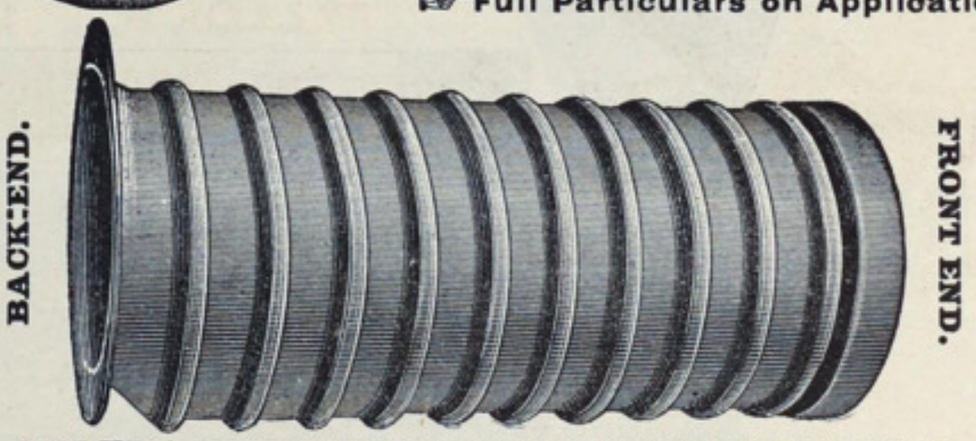

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UNITED STATES ENGINEER OFFICE, 366 Milwaukee St., Milwaukee, Wis., Oct, 27, 1896. Sealed proposals for: Kewaunee Harbor, Wis., 425 feet pile pier extension; Manitowoc Harbor, Wis., 500 feet crib pier extension; South Milwaukee Harbor, Wis, 180 feet pile pier extension; Racine Harbor, Wis., 250 feet crib pier extension; Kenosha Harbor, Wis., 250 feet crib pier extension; will be received here until 12 o'clock noon November 27, 1896, and then publicly opened. Information furnished on application. GEORGE A. ZINN, Capt., Engrs. Nov.21

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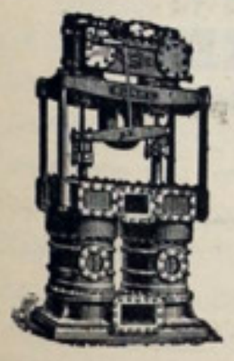

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Single and Duplex Pumps for Boiler Feed, Fire or Bilge Service—Vertical and Horizontal.
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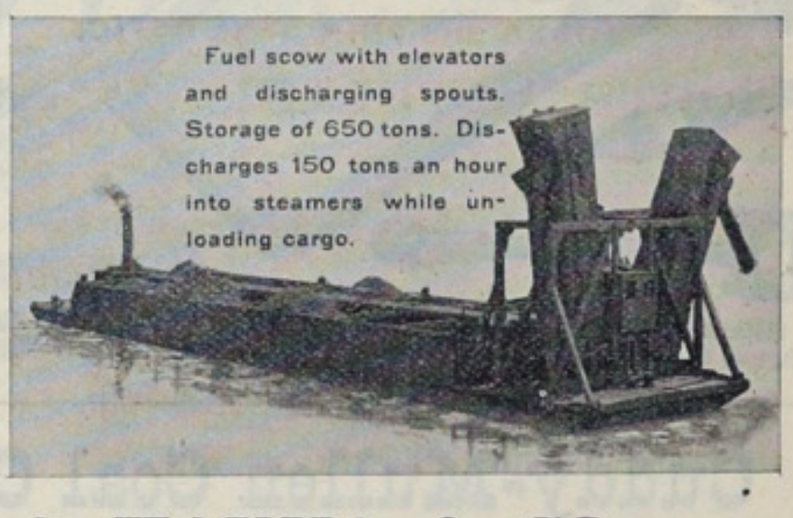
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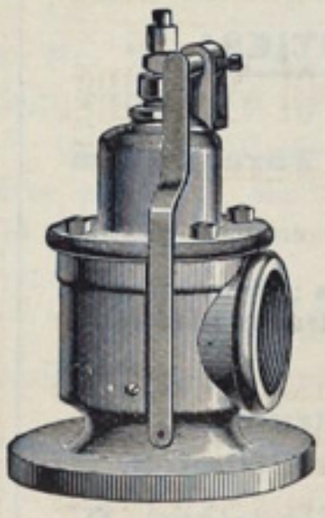

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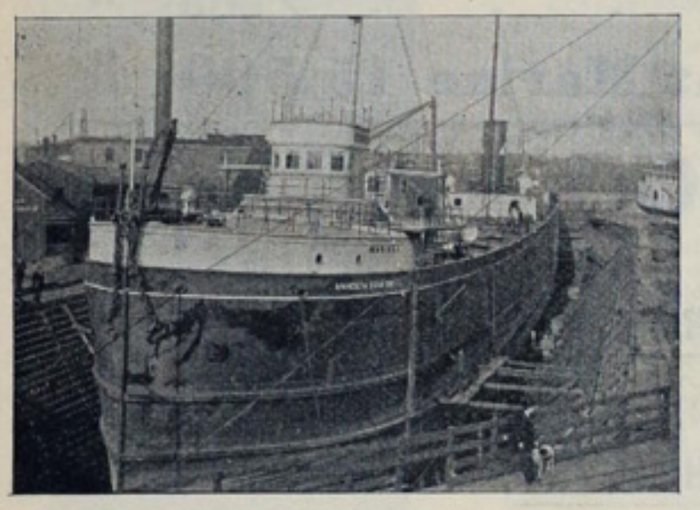

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Dimensions of Dock:
Lth. over all, 360 ft.
Lth. on blocks, 340 ft.
Width of gate, 50 ft.
Depth over sill, 20 ft.

Capt. W. W. BROWN, Sec'y & Mgr.

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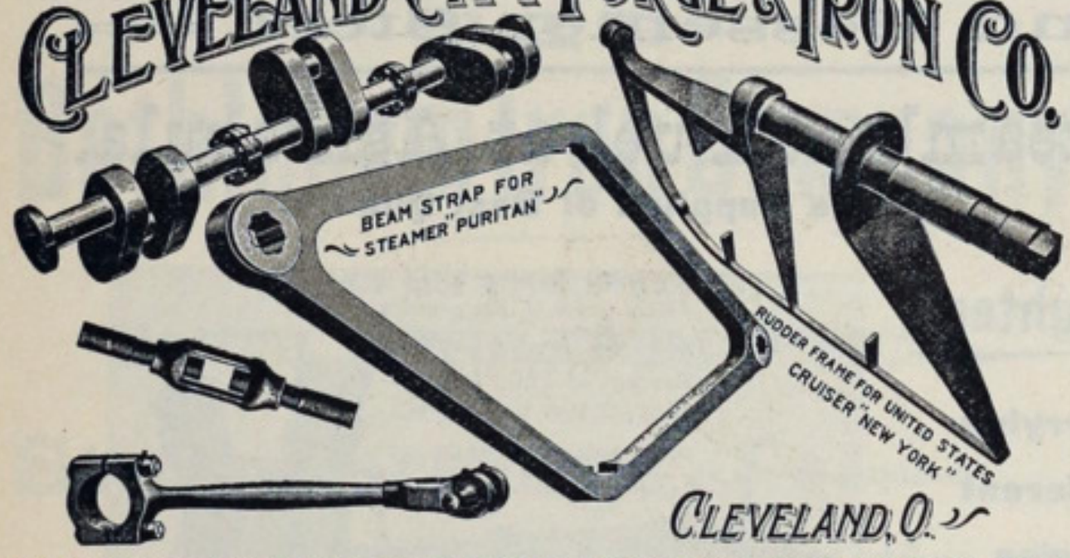

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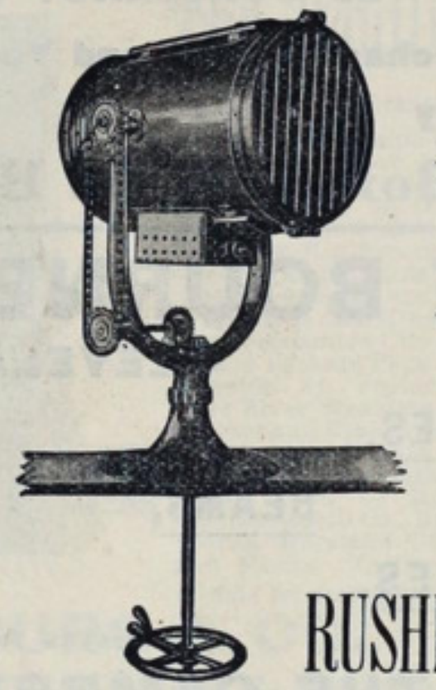

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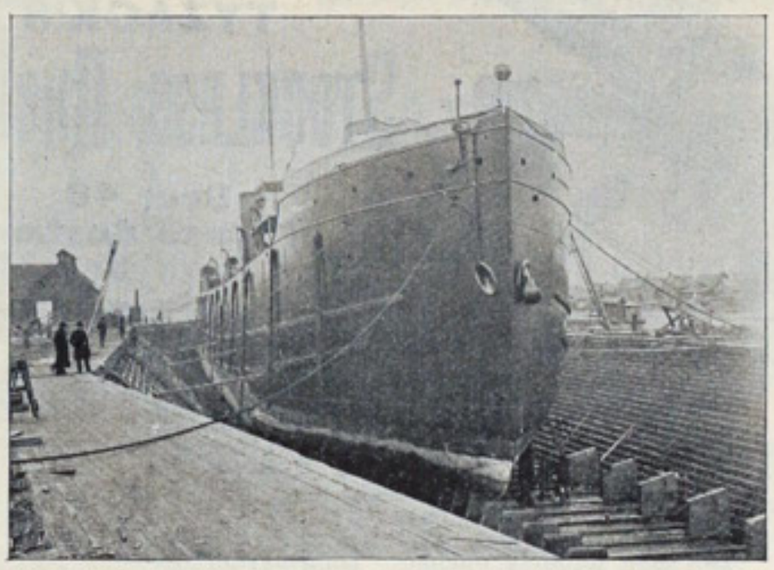

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SIZE OF DOCK.

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Breadth, Top	90 " 4 in.	Entrance, Bottom	50 "
Breadth, Bottom	52 "	Depth over Sills	18 "

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Prices for Repairs and Docking same as at lower lake ports

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U. S. ENGINEER OFFICE, 1101 D. S. Morgan Building, Buffalo, N. Y., October 15, 1896. Sealed proposals for 12,500 feet of Breakwater extension, and for Sand-Catch Pier extension at Buffalo, N. Y., under continuous contract will be received here until 11 A. M. November 30, 1896, and then opened. Specifications and information furnished on application. T. W. SYMONS, Major Engrs. Nov. 25.